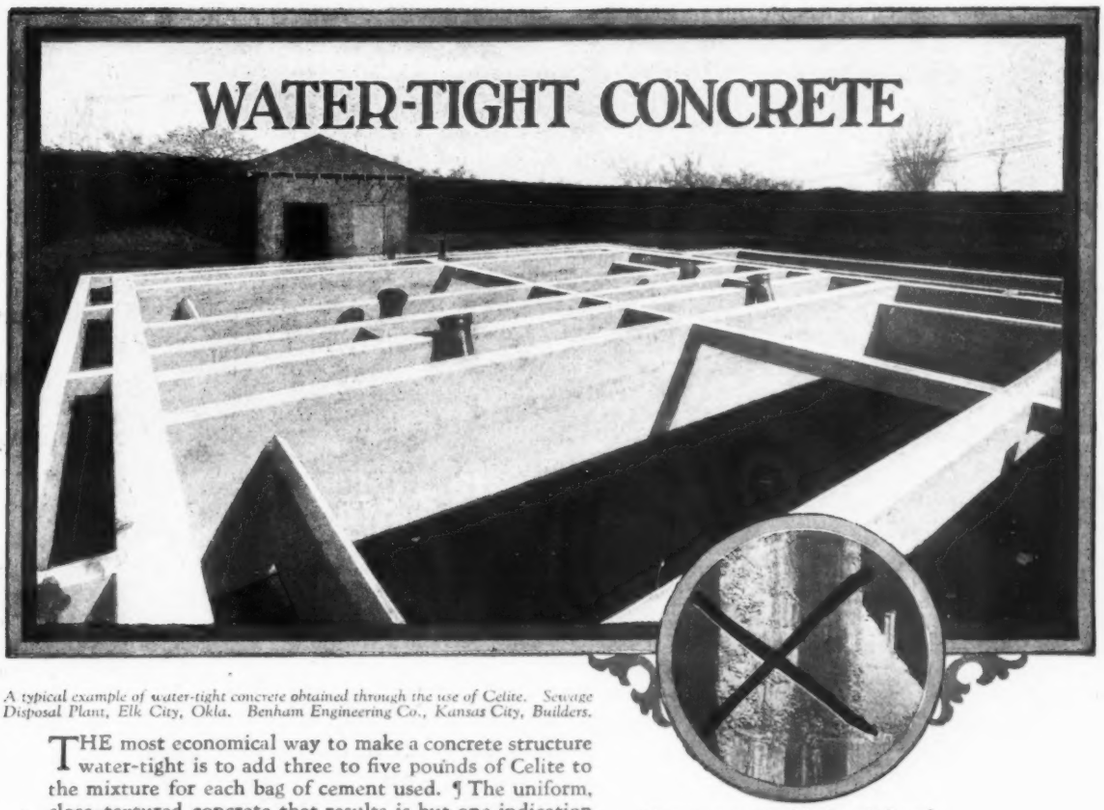
PUBLIC WORKS

WATER-TIGHT CONCRETE



A typical example of water-tight concrete obtained through the use of Celite. Sewage Disposal Plant, Elk City, Okla. Benham Engineering Co., Kansas City, Builders.

THE most economical way to make a concrete structure water-tight is to add three to five pounds of Celite to the mixture for each bag of cement used. ¶ The uniform, close-textured concrete that results is but one indication of the economies effected by using Celite. This inactive admixture improves workability to a degree that cannot be duplicated by any other means. It prevents segregation during hauling, chuting or gunning. ¶ Write for the complete story of admixtures in concrete, Bulletin U-325. Address Celite Products Co., 11 Broadway, New York, or 53 W. Jackson Blvd., Chicago, or 140 Spear St., San Francisco.

Disastrous segregation like this, which weakens concrete and destroys its water-tightness, can easily be avoided when Celite is added to the mixture. Concrete containing Celite is often hauled three or four miles from a central mixing plant, and delivered to the forms as thoroughly mixed as when it left the mixer.

CELITE

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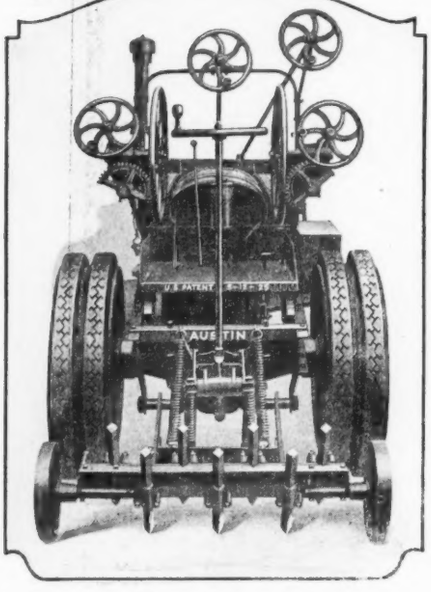
DECEMBER, 1926



Rear type of scarifier used on Austin Motor Graders. This attachment is exceedingly useful in scarifying roads that are too hard for the grader blade, thus greatly increasing the capacity of the machine.

LEVELING OFF THE ROUGH SPOTS

THAT'S the job usually assigned to Austin-International Motor Graders—and that's exactly what they do. If it's a badly rutted gravel road the Austin-International (15-30) will cut right down to the bottoms of the corrugations leaving a smooth, hard surface once more suited for high speed traffic. Not only that but it has sufficient speed and blade length (12 ft.) to do the work quickly and inexpensively.

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PUBLIC WORKS

CITY COUNTY STATE

A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol. 57 December, 1926 No. 11

Street Widening in Syracuse

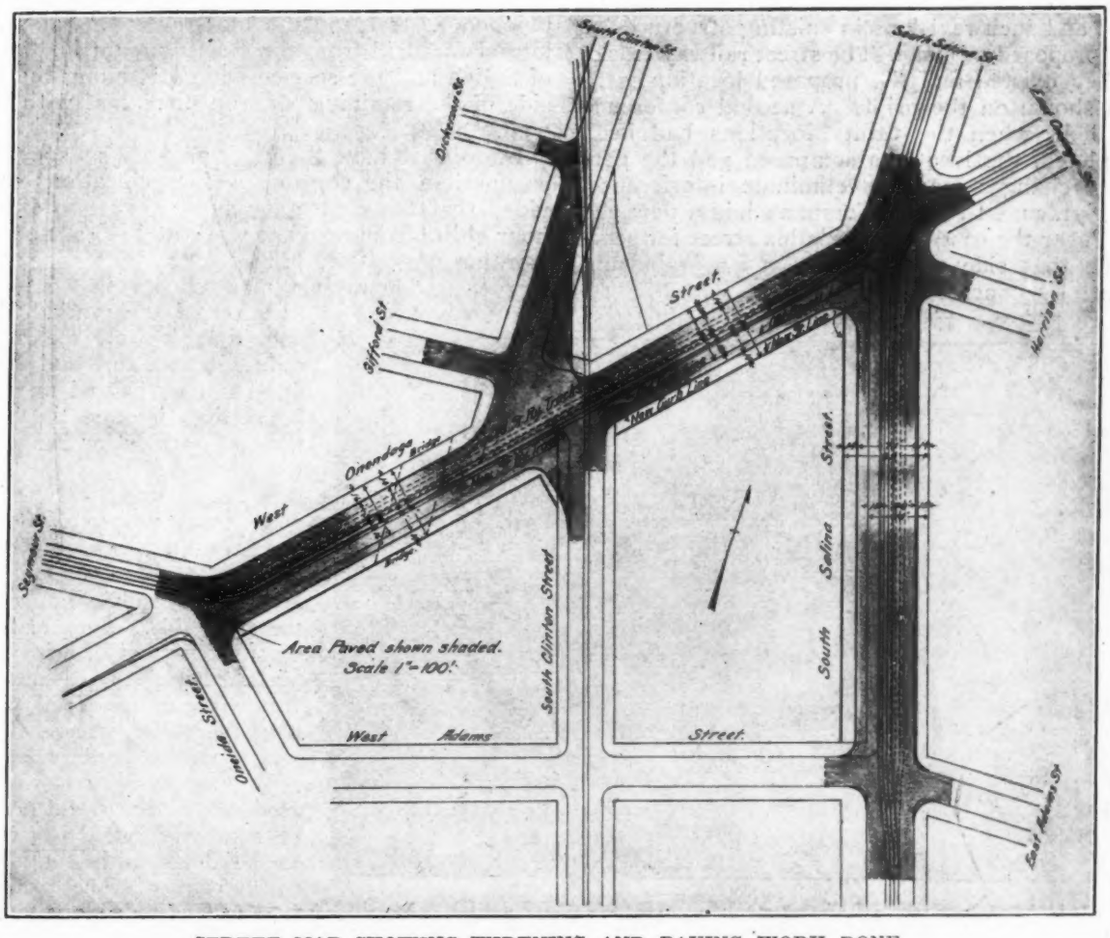
Widening of twenty-one hundred feet of main business streets, relaying of car tracks, gas and water mains and wire conduits, building retaining walls walls and bridge, and paving the entire area completed in eighty-two working days, or ninety-five days elapsed time.

By Nelson F. Pitts, Jr.*

On May 18th of this year the City of Syracuse started its largest project of the year—that of widening West Onondaga street from South Salina street to Oneida street, a distance of approximately 1,000 feet; South Salina street from West Onondaga street to Adams street, a distance of about 800 feet; and South Clinton street, from West Onondaga street to the D. L. & W. R. R. tracks, a distance of 300 feet.

This project involved the relaying of the street railway tracks, reconstruction of the existing

*City Engineer of Syracuse.



STREET MAP SHOWING WIDENING AND PAVING WORK DONE

subways and construction of additional subways, and the removal and replacing of the ornamental lighting by the Syracuse Lighting Company, the New York Telephone Company, and the Western Union Telegraph Company, laying new gas and water mains, the addition to and reconstruction of the bridge over Onondaga creek, the razing of the buildings affected, and the construction of a retaining wall the full distance on the south side of Onondaga street and the west side of Salina street.

In view of the fact that this improvement was in the heart of the business section and that Salina and Onondaga are the main arteries of traffic, feeding the business section from the southern and southwestern section of the city, it was paramount that this work be carried to a point of completion as rapidly as possible.

In order to accomplish this, it was necessary to have the co-operation of all interests affected in formulating the activities to the point where the construction work of one would not conflict with that of another so that the work could be carried along at such speed as to reduce to a minimum the withdrawal of the roadway from traffic. To achieve this co-ordination, the city engineer held a conference with the representatives of each of the utilities affected and explained the work to be done and gave to each a set of prints of the work, asking them to locate on the prints the structures they proposed to build and such revisions in existing structures as they proposed to make. The street railway tracks as they existed and the proposed location were both shown on the prints. A second conference was held when the utility locations had been completed, the locations compared and the necessary changes made to eliminate interference. The Syracuse Lighting Company laid a new gas main near the east curb on Salina street for service on that side of the street and a main supported by concrete brackets built with the retaining wall on the west side to service the west side, eliminating services across the street. The existing gas main on W. Onondaga street was on the north side, so a new main was laid on the south side to serve that side.

W. ONONDAGA, LOOKING N. E. FROM ONEIDA. CENTER BACKGROUND, BUILDING FORMS FOR FLOOR SLAB. RIGHT FOREGROUND, RETAINING WALL, FILL PARTLY MADE.

The Bureau of Water laid a new main just inside the curb on the east side of Salina street connected to the existing main about midway of the block and three 8-inch lines were laid from the existing main west through the retaining wall to supply six properties on the west side, these services being located at the dividing lines of the properties. To supply the south side of Onondaga street, in the block west of Salina, a lateral was laid from the existing main just west of Salina and the service main laid along the inside of the retaining wall on piers cast with the wall.

In order to have the work progress as speedily as possible, the contract and specifications provided that the contractor must work two eight-hour shifts, commencing work at 5:30 a. m. and working until 10:30 p. m.

The accompanying plan shows the general location of the work. The light lines indicate the street railway tracks, curb and street lines as they existed and the heavy lines indicate the locations of each when the work was completed.

S. Salina street was 70 feet wide from property line to property line, and was widened to 99 feet by taking 29 feet from the buildings along the west side. The roadway was 40 feet wide, with two 15-ft. sidewalks, and is now 71 feet wide, or one foot wider than the entire street before, with two 14-ft. sidewalks.

W. Onondaga street was 66 feet wide and was widened to 88 feet by taking 22 feet from the buildings on the south side of the street. The roadway is now 60 feet wide with two 14-ft. sidewalks.

GENERAL VIEW OF S. SALINA AND W. ONONDAGA STS. THE FLORENCE APARTMENTS WAS BOUGHT BY THE CITY, THE BUILDING WRECKED AND THE SITE SOLD AFTER THE IMPROVEMENT WAS COMPLETED.

AT LEFT—POURING RETAINING WALL WEST SIDE S. SALINA ST. AT RIGHT—LAYING ASPHALT TOP ON EAST SIDE S. SALINA ST.

The pavement was three inches of sheet asphalt laid on a 10-inch concrete base, mixed 1:2½:5 and reinforced with ½-inch square deformed steel bars at every point where the settlement of the subgrade might be possible.

The bridge floor was reinforced concrete slab mixed 1:2:4. The bridge abutments and wing walls are of concrete mixed 1:3:6. Lumnite cement was used in all of these to reduce to a minimum time required for setting.

The retaining walls were erected far enough ahead of the other work so that Portland cement was used for this concrete, mixed 1:3:6.

All curbing and headers used on the work were granite 5"x16", set in concrete.

The contractor used a 1,180-ton batcher plant and large trucks with batch bodies each carrying three to four batches of concrete were used to haul from the plant to the mixers on the work.

The mixers used were 21 E Foote and Rex pavers and a 27 E Foote paver.

Rough grading in part was done with a Keystone excavator and the old pavement and street railway track was torn up with Erie shovels.

The excavation for the bridge abutments was made with an Osgood shovel equipped with a long boom and a clam shell bucket.

All cutting and drilling of trenches and railway tracks was done with compressed air.

The hauling from the contractor's plant was done mostly from the north through Clinton street. The traffic on this street is heavy and passes through the wholesale business district.

On May 17th flood lights were installed along the tops of the buildings on the north side of Onondaga street from Salina to Clinton.

On May 18 the contractor started tearing up the pavement east of the D. L. & W. tracks, at the same time started laying a temporary street car track in West street, for one block, from Gifford street to Seymour street, so that the lines operating through W. Onondaga street could be re-routed and the street car traffic eliminated from the work. The temporary track was finished May 20th, and street cars started running over it early the morning of the 21st.

On June 26th the north side of Onondaga street was finished, including laying the street railway track and paving between the rails.

The paving between the rails and four feet outside was sandstone block with cement grout filler. The grout for the four-foot strip outside the rail was composed of 1 part sand and 1 part Lumnite cement. This permitted the laying of top the next day.

The time saved by using Lumnite cement is illustrated by the bridge work. The bridge floor slab, north side, was finished at 3 p.m. June 23. At 7:30 a.m. June 24th, a 21 E mixer was run to the middle of this new slab and the slab under the north street railway track was poured. In the afternoon of June 24th, binder laying was started at Seymour street on the north side, and the trucks loaded with binder ran across the bridge.

Clinton street from Onondaga street to the D. L. & W. tracks was finished and opened to traffic June 29th.

BRIDGE FLOOR SLAB JUST FINISHED ON NORTH SIDE OF W. ONONDAGA ST. AT LEFT. POURING PAVEMENT BASE IN CLINTON ST. INTERSECTION IN BACKGROUND.

On July 5th excavation of old pavement curb and walk on the west side of Salina street was started, to permit laying the new west railway track. This track had to be completed before the old track could be moved, as there was no possibility of re-routing the cars. This track was finished and cut over to the old track at each end. The removal of the old west track was then started and removal followed up with construction of the new east track and then removal of old pavement and east track.

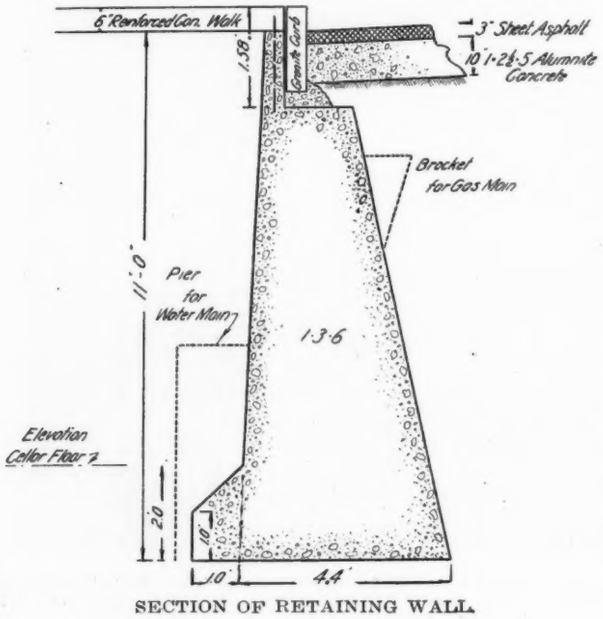
The cutting in of the new east track on Salina street completed the new special work at Salina and Onondaga. This was accomplished early in the morning of July 20th, and street car traffic on Onondaga was resumed on July 22nd.

In the meantime the Clinton street intersection west of the D. L. & W. tracks and south of Onondaga street was completed and opened to traffic.

The next move was to complete the Harrison, E. Onondaga and Salina intersection, which was opened for traffic July 24th. This intersection involved considerable work for the street railway company, for all of the special work had to be replaced with new material due to the changes in alignment. Concrete base and paving done under railway traffic.

During this time the work of pouring the retaining wall was going on. This wall was built through the old cellar areas, consequently the space between the old cellar wall and the new cellar wall had to be filled. This filling was deposited by continuous scattering of dry material, from ½ inch to 2 inches thick, and continuous tamping. Retaining walls were completed August 10th.

The new section of the bridge over Onondaga creek, consisting of two plate girders 72 inches deep, 71 feet 9 inches long, spaced 20 feet 6 inches, centers. The new north girder was spaced 3 feet 6 inches center to center from the old south girder and cross-braced to it. The floor beams are 24-inch I's 100 lbs. spaced 10 feet centers, and the stringers are 12-inch I's 31½ lbs. spaced 3 feet 5 inches centers. Steel work was completed August 10th and forms for floor slab started at once. The concrete base had been laid on the south side of Onondaga to the east end of the bridge previously. The concrete base was poured from Oneida street east and across the bridge, and at noon on August 21st the asphalt surface was finished, completing the project, in a total time of 82 working days clear from traffic interference.



SECTION OF RETAINING WALL

There were two conditions that came to our attention while using Lumnite cement. One was that in hot weather it was impossible to keep the pavement base from cracking by sprinkling, but covering the base when about one hour old with burlap and keeping the burlap wet prevented the checking. The other condition was the adhesive condition of the mortar of Lumnite cement. The stones in the batch as dumped from the mixer were all thoroughly coated with mortar and did not roll from the mass or the mortar wash from the stones if the mix was too wet, as it does when using Portland cement.

The widening of S. Salina street from W. Onondaga street to Temple street was provided for by ordinance of the Common Council on February 23, 1915. The land required (29 feet in width) between Adams and Temple street was bought without litigation. It was an old resident section and all buildings were well back of the new street line. The strip between W. Onondaga and Adams streets has been a court battle and was finally settled last November. The widening of W. Onondaga street and the acquisition of land was ordered by ordinance of Common Council December 7th, 1925.

The cost of the improvement is approximately as follows: Construction, $253,000; razing buildings, $17,000; real estate, $330,000.

Cost of Electric Heating

In the latest annual report of the Department of Lighting of the city of Seattle, the use of the city's electric current for heating houses is not encouraged. There are 700 houses using electric heat exclusively in Seattle, and many thousands of homes in which electric heat is used as an auxiliary. But even at the rate of one cent per kwh, the cost of heating is approximately equivalent to using coal at $20 a ton, and only those who can afford to pay at this rate for the greater cleanliness and convenience obtained should consider its use. The cost of electric heat for an average five-room house at one cent per kwh has proved to be in the neighborhood of $175 per year. Moreover, the report states that, as all electric heaters are 100% efficient, no further economy can be hoped for in this direction.

Longest Highway Lighting Installation

The placing of 250 General Electric "Novalux" highway lighting units on the 15 miles of road leading from South Jacksonville, Fla., to

Pablo Beach completes the largest installation of highway lighting in the country. The lights are spaced 300 feet apart on a pole line set for the purpose and are on one side of the highway only, on which 250-candlepower lamps are mounted 30 feet above the surface of the highway. The equipment also includes a 50 kw. Type RV transformer.

As this is the main thoroughfare leading from South Jacksonville to the beach, the traffic during the summer is very heavy. Until recently the brick highway was too narrow for the amount of traffic it carried, and there was no lighting equipment, but it is now a double concrete highway and well lighted, and there has been a noticeable decrease in the number of accidents which have occurred there.

Worcester's New Sewage Treatment Works

New Imhoff tank and sprinkling filter plant takes place of old chemical precipitation and sand filtration. Old sand filters used for sludge drying.

Worcester, Mass., began on June 8th, 1925, using a new sewage treatment works and put the plant into official operation on June 25th. This plant had been under construction for five or six years and was completed at a cost of nearly $3,500,000. It was designed to care for a daily average flow of 28,000,000 gallons from an estimated population of 242,000 in 1934. In his report written at the end of 1925, Andrew B. Holmstrom, superintendent of the Sewer Department, states that the plant had already been a great success as 1925 was the first year in many that the Blackstone river and the effluent from the plant had been stable, and the odors about the plant had been practically eliminated.

The new plant consists of a grit chamber and coarse bar screens located about 1,500 feet from the rest of the plant; twelve double Imhoff tanks, four pairs of dosing tanks, four trickling filters having a total area of 14 acres, four final sedimentation tanks, and an effluent channel to the river.

Each Imhoff tank is 60 feet wide by 90 feet long and 31 feet deep not including 2 feet of free-board. The sedimentation compartment capacity of each tank is 202,600 gallons and the detention period provided by the design is 2.1 hours. The area of gas vent represents 21% of the total tank area. Each tank has two rows of three hoppers each in the bottom of the sludge compartment. The sludge capacity represents 2.54 cubic feet per capita for the population provided for in the design.

In beginning the operation of the plant in June, 1925, small quantities of sewage were admitted to the tank during the day for the first two weeks, mainly to fill the first six Imhoff tanks (the others were not fully completed) and to start bacterial action in the sludge deposited. During the next eighteen days a small quantity of sewage was treated in the Imhoff tanks during the entire 24 hours of each day; following which the entire flow was turned into these tanks, and the remaining six were placed in operation from time to time as they were completed.

During the latter part of the year, when the average detention period in the tanks was 3.6 hours, the removal of settleable solids in the tanks, determined in the daily composite samples, averaged from 96 to 99 percent, according to a one hour test. A two hour test showed considerable increase, indicating the presence of a large proportion of solids in a colloidal condition. The percentage removal of suspended solids as determined by the Gooch method averaged between 50 and 65 percent. The removal of total organic matter, as measured by albuminoid ammonia, varied from 30 to 40 percent; or from 40 to 50 percent as measured by oxygen consumed.

The grit chambers have presented some interesting problems, according to the report of Mr. Holmstrom. "The total length of the grit chamber and screen installation is 117 feet, while the effective length of the grit chambers is about 75 feet. The grit collection pits are 7 feet wide, 2½ feet deep at the inlet end and 4 feet deep at the outlet end. The walls are vertical to the height of the 72-inch sewer invert, then the cross-section increases to 8 feet in the next 3 feet of height and remains the same in the additional 5 feet of height. This arrangement is designed to use both chambers and reduce the velocity of flow of the sewage to approximately one foot per second. The minimum rate of flow of sewage is about 9,000,000 gallons and the maximum, 67,000,000 gallons per 24 hours. The average daily sewage flow is about 22,000,000 gallons.

"The capacity of each grit compartment is approximately 66 cubic yards. Disposal of the grit accumulation has been arranged for by installing a 30-inch square sluice gate in the east side wall of each pit at the outlet end of the chambers, through which the grit can be flushed to one of the sand filters of the old sewage treatment plant. As the deposit on this filter increases, it is proposed to remove it with a steam shovel and teams.

"Bar screens having 2-inch openings between the bars and placed at angle of 45 degrees are installed at the outlet end of each grit chamber. They are each 8 feet wide and 10 feet 11½ inches long, having a total area of 192 square feet, while the effective area representing a full sewer and clean screen, is 68 square feet in each screen, or a total of 136 square feet.

"No information having been given of the fact that the design called for the use of both chambers at all times, nor attention being called to the use of only one chamber, both chambers were not used until September 25th... The first cleaning of a grit chamber was attempted on August 18th along the flushing lines as planned.

It was not a success, nor were later cleanings in September or October. A Byers auto-crane and teams were then used and both chambers were thoroughly cleaned. Since that time, this crane not being available, two cleanings of each chamber, November 17th and December 8th, have been made along the original flushing line. Following the first cleaning, it was considered that the grit deposit on the bottom and principally in the inlet two-thirds of the chambers, would average about nine inches when spread over the entire chamber. Following the second cleaning, December 8th, this measurement was considered as being fully eleven inches. The deposit of soft material on top of the grit and especially near the screen at the outlet end of the chambers is readily flushed out of the chamber by lifting the inlet gate. The top of the grit also is moved, but the bulk of the heavy grit can be removed only by means of a bucket or wheelbarrowing it to the outlet gate."

In view of this experience, Mr. Holmstrom believed that the auto-crane should be kept at the grit chambers for cleaning purposes or that some mechanical means be provided for this purpose.

It was found that the new tanks were receiving an abnormally large amount of sludge, in explanation of which it is stated that the sewage contains industrial wastes, most important of which is ferrous sulphate from steel works, and large doses of lime waste, making a strongly alkaline sewage for a few hours nearly every week day. The result is chemical precipitation of the sewage before it reaches the sewage treatment plant and the precipitated ferrous hydroxide forms an excessively large quantity of sludge. The sludge is discharged for drying upon the sand filters of the old plant, which are being used as sludge drying beds. Since writing this annual report, a new method of removing the sludge from the beds has been adopted, and Mr. Holmstrom has kindly explained this for us in the article which follows this one.

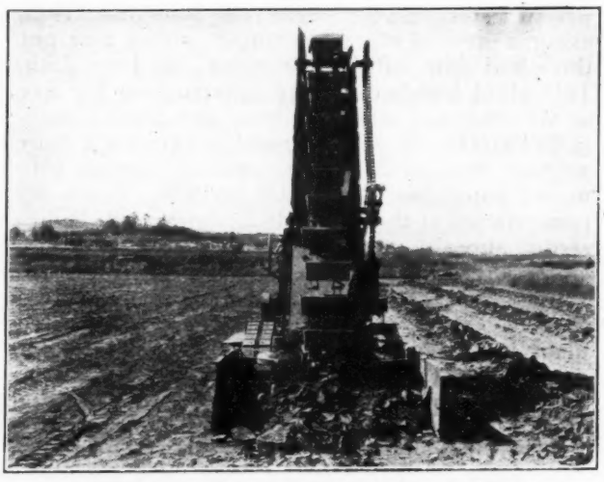
Sludge Handling in Worcester

By Andrew B. Holmstrom*

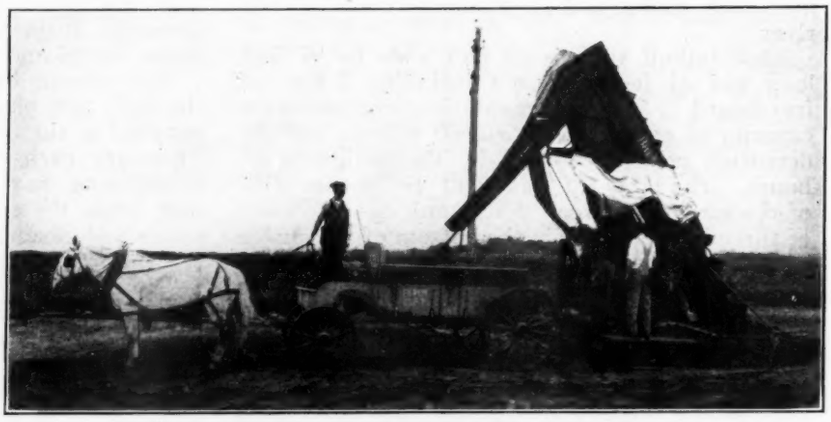
The substitution of machines for hand shovels in handling sludge at the sewage treatment plant of Worcester, Mass., has resulted in considerable economy. The sludge from the Imhoff tanks is drawn off upon twenty-three drying beds, which are square, each containing one acre in area. These beds were formerly used for intermittent filtration of the sewage and have not been changed in using them for drying of sludge. The area is greater than is necessary and the thickness of the sand, 54 inches, would be much less had the beds been constructed especially for this purpose. The sludge is drawn on to the beds to a depth of 6 to 12 inches. As drawn from the tanks it contains from 94 to 96 percent water. It is dried until containing from 20 to 60 percent water, which requires from three to four weeks time, varying with the weather conditions.

Until recently, the dried sludge was loaded into wagons by hand and hauled to a dump, the average length of haul being 350 feet. The cost of this varied from 90 cents to $1.00 per cubic yard. About six months ago a change was made in the loading, a Barber-Greene loader having been put into operation and it has been in continuous use since then.

In the new system of handling, the dried sludged is scraped into windrows six feet wide by means of a two-horse road scraper. This requires 2½ to 4 hours for each bed. The loader could load directly from the beds without windrowing, but it would require many trips across the beds, and the use of the scraper first saves in time and cost. The loader then travels along each windrow, discharging the sludge into horse-drawn two-yard Watson wagons. These cart the sludge to dumps located alongside the drying area, the average haul being about 600 feet. Horse-drawn wagons are found more eco-



REMOVING DRIED SLUDGE FROM BEDS.



LOADING SLUDGE INTO WAGON.

*Supt. of Sewer Dept., Worcester, Mass.

nomical than trucks because of the short haul; to keep the loader moving constantly would require practically as many trucks as wagons, which would mean a large initial expenditure to say nothing of the additional expense of maintaining the same. The cost of loading and hauling to the dumps, using the mechanical loader, has ranged from 29 cents to 42 cents per cubic yard during the six months of operation, depending upon the length of haul. The cost of operating the machine is about 2 cents per cubic yard of sludge removed. During the six months there have been no repairs.

Even with the large amount of sludge produced, which has totaled about 14,000 cubic yards of dried sludge since May 10th, when the machine was put into operation, it has been necessary to use the loader only 89 days out of the 174. A very important feature of this work is that the machine is always ready to go into a bed the moment the sludge is dry enough to handle.

The organization used with the loader consists of one foreman, one operator, 2 men at the loader, 2 men on the dumps, and 3 to 5 wagons. About ten gallons of gasoline is used a day. The oil is changed weekly.

The special machine used at Worcester is equipped with 14-inch crawlers instead of the 9-inch usually provided, to prevent the machine from sinking into the sand. This gives a load of 6.9 lbs. per square inch. Special plows have been built on each side of the revolving discs, as on the Barber-Greene snow loader. The chute is covered to prevent dust from flying. In all other respects, the machine is similar to the standard machine.

The importance of sludge handling and disposal at a large plant like that of Worcester is indicated by the fact that, of the $60,000 appropriated for the operation of the plant, about $14,000 will be expended on sludge alone, and the cost of this would have been about $30,000 if the work was being done by hand.

Close Bidding

Bids received on September 24th for a part of the New York subway show unusually close bidding and apparently reflect credit on both the engineers who made the plans and specifications and the contractors who bid thereon. Fifteen bids were received and the two lowest differed from each other by only six one hundredths of one per cent; while seven were below a total ten percent higher than that of the lowest bidder. The lowest bid was for $1,195,000, the next lowest was for $1,195,724; while the highest bid was for $1,763,385. The greatest variation was found in the bids for underpinning buildings, of which there were twelve items. Three contractors made a merely nominal bid of $1.00 for each of these items, while another made a bid of $1,000 each.

The total bid for underpinning varied from as low as $12, or $1.00 each to as high as $98,703. The total of the bidder who was low on the entire work was $76,500, while that of the second lowest bidder was $31,004.

Responsibility for Water-Borne Disease*

Opinion of Attorney General of Illinois on legal liability of municipality or company for diseases caused by polluted water supplied by it.

By Isaac D. Rawlings and Harry F. Ferguson†

A little over two years ago there occurred a wreck of the Twentieth Century Limited, the crack New York Central train, which gained headlines in the press throughout the country. It was a disaster, but only a comparatively few people were killed or injured as compared to the number of people that have been killed or injured by water-borne illness. Investigations were made to determine the cause and place the responsibility for the wreck. If a few people in an automobile are killed, the community in which such happens is aroused and nearly everyone reads the details in the papers with great interest. The coroner makes an investigation and places the blame. If a person, mentally unbalanced, kills or maims a person with a bullet or other weapon, the community in which such occurred would be very much aroused. And yet, in similar communities deaths have occurred and still do occur by the furnishing of drinking water that is not safe.

Why should a person or persons who are responsible for furnishing safe drinking water permit, by neglect, carelessness or deliberate indifference, polluted water to go through piping systems which they know human beings are to use for drinking water? An epidemic of disease is not quite as spectacular as a train wreck or a murder by bullets, but they cause greater suffering, greater loss, and are the least excusable because they can be prevented.

Some of you have perhaps read in the pages in the Manual of Water Works Practice published by the American Water Works Association, the quotations from court decisions dealing with damage suits and responsbility for water-borne epidemics. No court decisions have been rendered in Illinois, but the Attorney General of Illinois in a recent opinion to the State Department of Public Health points out that the law on the basis of court decisions in other States recognizes the responsibilities of cities, water companies, and individuals furnishing water for general use. Believing that the Attorney General's opinion would or should be of interest to waterworks officials in Illinois it is quoted below in full as follows:

*Part of paper before Illinois Section, American Water Works Association.

†Director and chief sanitary engineers, respectively, of Illinois State Department of Public Health.

You have requested my opinion on the liability of a municipality or water company for disease resulting from pollution of water furnished the inhabitants of the municipality, under the conditions assumed in three questions. The first of said questions is as follows:

"1. If a public water supply should unquestionably cause typhoid fever or other water-borne illness and assuming that the supply was considered safe by the general consuming public and no advice or warning had been given by the proper officials would.

a. A city or its officials be liable in case the city owned the supply?

b. A water company be liable in case a water company owned the public supply?

c. The city be liable if a public supply was owned by a private company and the city had not advised or warned the company of the dangerous conditions?"

Where a municipality acts in the dual capacity of furnishing water, gas or other commodity both for public and private use, under authority of law, it stands upon the same footing as would a private corporation or individual and is alike liable for its negligence or wrongful acts.

Village of Palestine v. Siler, 225 Ill. 630
City of Chicago v. Selz, Schwab & Co., 202 Ill. 550
Wagner v. City of Rock Island, 146 Ill. 154

The liability of a water company or individual supplying water for general use to the inhabitants of a municipality for injuries to health resulting from contamination of its water has not been declared by the courts of this State. Neither have our courts stated such liability of a municipality except in the general rule of the cases above cited and decisions of this question in other states are few.

In Jones v. Mount Holly Water Company, 87 N. J. L. 106, it was held that one who undertakes to trade in water and supply customers therewith is bound to use reasonable care that the water so supplied shall be ordinarily and reasonably pure and wholesome. Actual notice or knowledge of the unwholesomeness of the water of such company is not an essential element to be proven in order to establish defendant's liability; it is sufficient if there is testimony tending to show that the defendant in the exercise of reasonable care might have discovered the unwholesomeness and dangerous condition of the water.

In Hayes v. Torrington, 88 Conn. 609, it was said:

"The duty which a water company owes to the public and to its customers is that of exercising reasonable care and diligence in providing an adequate supply of wholesome water at all times. Dillon on Municipal Corp. (5th Ed.) Sec. 1316; Green v. Ashland Water Co., 101 Wisc. 258; Danaher v. Brooklyn, 119 N. Y. 241; New Haven Water Co. v. Russell, 86 Conn., 361. Such a corporation is not a guarantor of the purity of its water or of its freedom from infection, but is bound to use reasonable care in ascertaining whether there is a reasonable probability that its water supply may be infected with a communicable disease from causes which are known to exist, or which could have been known or foreseen by the exercise of reasonable care; and if the exercise of such care would have disclosed a reasonable probability of such infection, then it becomes the duty of the water company to adopt whatever approved precautionary measures are, under the circumstances of the case, reasonable proper and necessary to protect the community which it serves from the risk of infection."

In Green v. Ashland Water Co., 101 Wisc. 258, it was held that a distributor of water under a public franchise is not a guarantor or insurer of the wholesomeness of his water. But such distributor will be held liable for injury to consumers, without fault on their part from using the water furnished where such distributor knows, or from the situation ought to know, that the water it is distributing is dangerous for domestic use from some cause not discoverable ordinarily by the use of reasonable care, and failed to disclose such danger to such consumers. But it was also held that where the contaminated and dangerous condition of the water is a matter of common knowledge in the community, the presumption is that a member of the community of ordinary intelligence has notice of that condition of the water, and, in the absence of evidence to the contrary, that presumption will preclude a recovery by a person injured from using such water. If a person drinks water furnished by such company with knowledge, or reasonable means of knowledge, that it is dangerously polluted with sewage, he assumes the risk and can not recover on the ground of deceit or negligence.

In Keever v. Mankato, 113 Minn. 55, it was held that where a city owns and controls its water work system from which it furnishes water for the general use of its inhabitants, the city will be liable for negligence in permitting its water supply to become so contaminated that it causes typhoid fever.

Applying the rules of liability above declared to subdivision (a) of your first question, I think it clear that the city would be liable if its officials in charge of the water supply actually knew the dangerous condition assumed by your question, or by the exercise of reasonable care should have known it, and failed to give public warning thereof.

Answering subdivision (b) of your question, the water company would be liable if it knew, or by the exercise of reasonable care should have known, that the water supply was contaminated as aforesaid and did not warn its consumers of such condition.

Subdivision (c) of your question is whether the city would be liable if the public supply was owned by a private company and the city had not warned the company of the dangerous condition assumed by your question. To hold that the city is liable because it fails to notify the water company of that which such company already knows, or in the exercise of reasonable care should know, would be in effect to make the city liable for the negligence of the water company. I have found no case or text writer which goes to that extent. The efficacy of such warning given by the city to the water company to prevent illness as a result of using contaminated water furnished by the company would seem too uncertain to render the city liable for failure to give such warning, even where the company does not know the dangerous condition of the water. I am not aware of any statute or decision upon which the liability of the city under such conditions may be reasonably predicated.

Your second question is as follows:

"2. Would the responsibility and your opinions be changed if the State Department of Public Health had given due warning in writing to a city in case the city owned the supply, and to the water company and city in case the water company owned the supply, that the supply was subject to possible contamination and thereupon the city or water company or either or both did not act to remove such possible contamination or did not advise or warn the consuming public of the dangerous conditions while the dangers were being removed?"

Such warning would not be conclusive of the liability of either the city owning the water supply or of the water company owning it; but would be a fact strongly tending to show that the city or company knew or should have known the conditions of which it was warned, by putting it on notice thereof, and to establish negligence of the city or company in failing to remove the possibility of contamination to warn the public of the dangerous conditions set forth in such warning by the health department.

Your third question is as follows:

"3. Would a verbal statement by a representative of the State Department of Public Health, while carrying out his regular duties, that the public water supply is subject to contamination constitute a sufficient warning to city officials or a water company so that such city or water company would be liable in case dangerous contamination of the water supply did occur and water-borne illness resulted?"

In the absence of a statute requiring written notice of a state of facts assumed by your question, I think a verbal statement would be as efficient as a written statement where the proof that such verbal statement was made and the contents thereof to the proper representative of the city or water company is clear and satisfactory.

Summarizing the Attorney General's opinion we conclude that cities, water companies, and individuals supplying water for general use are liable for injuries to health resulting from contamination of such waters if the owners or operators of such water supplies have not exercised reasonable care in discovering and preventing possible contamination of the supplies or have not given due warning to the consumers that the supplies are subject to dangerous contamination. Further that a warning by the State Department of Public Health to a city, water company, or individual distributing a water supply, which supply causes injuries to health, would not be conclusive of the liability of such city, company or individual, but it would be a fact strongly tending to show that the owner of the supply knew of the dangerous conditions and would, therefore, practically establish the negligence of the city, company, or individual in failing to remove or prevent the contamination of the supply or to warn the public of the dangerous condition.

Illness that is water-borne in Illinois can be prevented, but only will be prevented when all of us realize our responsibilities and when those owning and operating waterworks systems exercise reasonable care and diligence. On the basis of the Attorney General's decision the next water-borne epidemic in Illinois, if another unfortunately does occur, may prove quite costly to the owners of the waterworks system.

Garbage Collection and Disposal*

Practice in several cities described in symposium by Sanitary Engineering Division of A. S. C. E.

BECCARI SYSTEM

In the June, 1923, issue of PUBLIC WORKS we described the Beccari system of garbage disposal. A plant using this system was constructed at Scarsdale, N. Y. during that year and went into operation on December 3rd, 1923. This plant was described by Arthur Boniface, village engineer of Scarsdale. It was designed for a population of 8,000, and is now disposing of the garbage from about 6,000 people. However, the amount of garbage obtained from the residents of that village averages almost one pound per capita, which is a much higher rate than was anticipated.

When placed in operation, this plant showed the characteristic fermentation vapors and heat, but garbage did not dry rapidly when taken from the cells, as had been anticipated and is said to be experienced elsewhere. Leaving the material in the cell up to fifty and even sixty-five days, did not seem to reduce the moisture content. One result of the high moisture content, which was found to be about 45%, was the presence in the digestive plant of considerable quantities of ammonia and nitrogenous gases, which, under certain atmospheric conditions, produced a serious nuisance when the digested material was removed from the cell. After trying other methods of drying, the material was taken to a farm in an adjoining township and dried on a platform in a shed about 100 feet long and 12 feet wide. After being so dried it was passed through a grinder and sold as fertilizer, and has demonstrated that it has a definite value when used in vegetable gardens and flower beds.

It was realized that this was not a desirable method of treatment, but that some device or procedure should be developed which would largely reduce the moisture before the material is removed from the cells. In order to secure this result, latticed wooden cones about two feet square at the base and four feet high were built, and seven have been placed in one of the cells to determine its effect. In addition, a fan operated by a 25 h. p. motor and capable of handling 2,000 cubic feet of air per minute has been installed to drive air into the cells, the air being previously heated by passing it between heat coils connected with a 15 h. p. steam boiler. This experiment was being tried out at the time the paper was written.

Although the plant had been operating for more than two years, Mr. Boniface stated that his paper must be considered in the light of a progress report and that definite conclusions would not be attempted. However, he believed that results to date could be summarized as follows:

"The plant was inexpensive to construct on account of its simplicity, and its operation required only labor of the ordinary class. Except for $6 for the purchase of sulphate of iron for charging the turrets, the plant has cost nothing for maintenance. The analysis of the humus shows an average content of 3.0% nitrogen, 3.5% phosphoric acid, 0.6% potash, and 45.0% moisture. The arrangement for absorbing odors from the cells during the fermentation process is adequate and entirely successful." However, "some means must be devised to reduce the moisture content of the humus while it is still in the cell in order to avoid objectionable odors during its discharge and to facilitate its preparation for the market. Although the moist humus, as taken from the cell, emits a characteristic odor, no trace of odor of any kind can be detected when the humus has dried." The fact that a Beccari plant lends itself readily to architectural treatment, is important for communities like Scarsdale. Mr. Boniface believes that "it has been conclusively demonstrated that the system is peculiarly adaptable to communities like Scarsdale and other high class residential developments; that it is one of the most scientific and sanitary methods yet invented; and that, with the perfection of one

* Concluded from page 387.

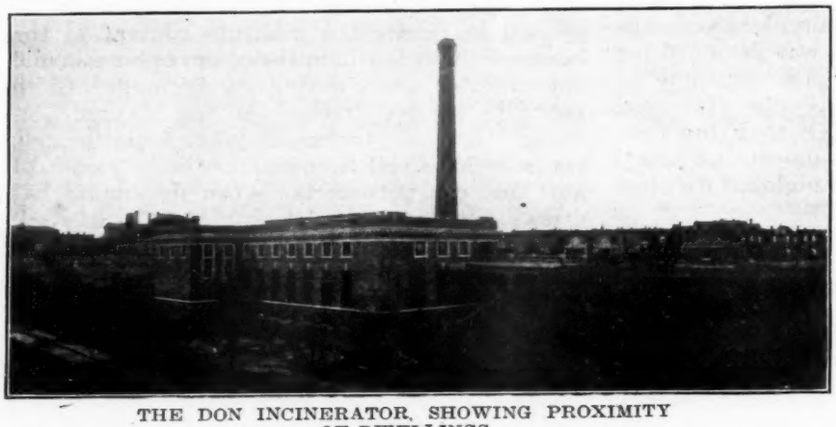
or two minor details of operation, it will prove of great value to those charged with the responsibility of the disposal of community waste in a safe and economical manner."

INCINERATION

The two high temperature incinerators operating at Toronto, Canada, were described by J. A. Burnett, superintendent of incineration and supervising engineer of the Dept. of Street Cleaning. The two plants are both "Sterling" four-cell furnace units, one known as the Don plant consisting of three units, and the other, the Wellington plant, consisting of four units. The former was placed in operation in 1917; and the latter in 1925. The fact that, after eight year's operation of the first plant, the second was built like it except for some minor changes resulting from experience obtained in operation and maintenance of the old plant, would indicate a satisfactory performance by it.

The Don plant had a guaranteed capacity of 180 tons in 24 hours, or 2½ tons per furnace hour. At present this plant is disposing of approximately 50,000 tons of refuse annually, which corresponds to a furnace capacity of 4½ tons per hour. The plant is near at least five public institutions and also a good class residential district, but no complaints are on record with respect to the operation of the plant. Both plants are of fireproof construction throughout. The cost of the Don plant was $225,000 and that of the Wellington plant $550,000; exclusive of land in both cases.

The furnaces are of the continuous grate regenerative type, the cells being divided by low-set air-cooled castings which render it possible to fire and clean the grates separately. There are no moving parts inside the furnaces. The material from the charging hopper drops onto a drying hearth at the back of the grate and is pulled forward and spread uniformly over the grate, where incineration takes place. The gases pass over the grates into the combustion or settling chamber, beyond which part of them pass into the regenerating chamber and through air heater tubes. The average combustion chamber temperature is maintained at from 1600 to 1800 degrees Fahrenheit.



THE DON INCINERATOR, SHOWING PROXIMITY OF DWELLINGS.

The material delivered to the plants averages about 55% moisture, 34% combustible, and 11% residue, and is a mixture of rubbish and garbage, approximately 60% garbage and 40% rubbish by weight. No ashes or incombustible waste is hauled to the plant.

One change made in the new furnace is increasing the width of the drying hearth, which renders the total grate area effective for burning; while in the Don furnace about 25% of the grate functions as a drying hearth.

Electric motor-driven blowers furnish a forced draft. The preheated forced draft is considered to be a marked improvement in the development of the high temperature destructor. It is believed that the Don destructor was the first plant in American practice in which the gases at final combustion chamber temperature were passed through air heater tubes. In the Don furnace these tubes were of cast iron, 5" x 5/16" thick; while in the Wellington plant seamless steel tubes were used. The author considered the durability of the latter to be problematical.

The labor requirements for these plants include one foreman of plants, one leading stoker for each unit for each shift, three charging men, two stokers and one ash-run man. In 1925 the total material incinerated by the Don plant was 50,159.7 tons, and the labor averaged 1.55 man-hours per ton at a cost of $1.50 per ton, this including labor, repairs, materials and supplies but not carrying charges. The Wellington plant incinerated 63,351.4 tons, requiring 1.33 man-hours per ton and a cost of $1.11 per ton. No repairs or renewals were made to the Wellington plant during 1925.

GARBAGE REDUCTION

The garbage reduction system of disposal was represented at this symposium by a description of the Cobwell system and some features of its operation at Rochester, N. Y., which was contributed by John V. Lewis, in charge of refuse disposal for the Department of Public Works of Rochester. The first Cobwell plant went into operation early in 1915 for handling the garbage of the Panama-Pacific Exposition at San Francisco. A few weeks later a 48-unit plant went into operation at Los Angeles. Afterwards other plants were installed at New Bedford, Mass., Staten Island, Syracuse and Rochester, New York, a modified Cobwell plant at Schenectady, N. Y., and a plant of similar type has been proposed by Cleveland, Ohio.

The most important feature of the Cobwell system equipment is the so-called reducer. This consists of a flat cylindrical steel shell about 10 feet in diameter and 4 ft. high. A steam jacket is provided under

the bottom and around the lower two-thirds of the circumference of the shell. A set of cast-steel plow arms, mounted on a vertical shaft with top and bottom bearings at the center of the shell, are rotated close to the inner bottom sheet of the reducer, their purpose being to give the garbage an undulatory motion. There is on top a charging door, a peep glass for observing the action within the reducer, and an outlet door for water and solvent vapors. The discharge door is set into the lowest part of the reducer shell and several perforated drain boxes project upward into the bottom of the reducer to serve as outlets for removing the grease extracted from the garbage and also as inlets for the volatile solvent and live steam introduced at various periods in the reduction cycle. Each reducer is equipped with an individual steam trap and the necessary steam, solvent and drain valves, drain sight glass, and piping.

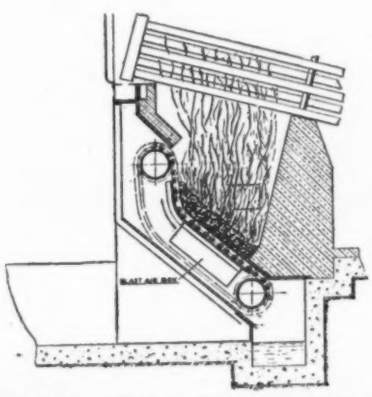
In other respects the layout of a Cobwell plant does not differ greatly from that of the older systems. The process is carried to its conclusion as a single, continuous, operation in the closed reducer, from which odors do not escape. The complete cycle requires from 18 to 24 hours, the so-called cooking requires 14 to 17 hours, and the washing 3 to 4 hours. Steaming ordinarily occupies one hour. Entirely submerged in a bath of petroleum naptha, the garbage gives up its moisture content and disintegrates at the comparatively low temperature of about 208 degrees Fahrenheit.

The Rochester plant is located within 500 ft. of State street and within three quarters of a mile of the geographical and business center of the city, and lies about 150 ft. below the level of the city streets bordering on the river gorge. While an excellent location from the standpoint of hauling the garbage, it is a critical one with respect to possible nuisance caused by obnoxious odors. The Cobwell plant was constructed by the city in 1921 at a total cost for buildings of $138,090 and for equipment $568,960. In calculating cost of treatment, depreciation charges are estimated at 2% on the buildings, 8% on the equipment and totaled $2.40 per ton in 1925. The operating cost in 1925 totaled $228,850, of which $72,285 was for salaries and labor, $67,050 for steam, $23,550 for solvent, and the balance for power, repairs, supplies, etc. This gives a unit cost of $6.60 per ton for operation. The revenue was $5.05 per ton of garbage treated, giving an operating loss of $1.55 per ton. As there was a capital charge of $2.40 per ton, this leaves a net cost or loss of $3.95 per ton. The operating cost of collection that year was $3.45. This leaves a net cost or loss, including both collection and disposal, of $7.40 per ton in 1925. In 1924 this net was $8.65. It was expected that by closer control of the process and the installation of new equipment, this net would be reduced about $0.75 per ton in 1926.

The revenues obtained were from grease, of which about 59 pounds per ton of garbage treated was obtained, for which there was obtained a price of $6.00 per 100 pounds, or $3.55 per ton of garbage treated. The tankage amounted to 375 pounds per ton of garbage treated and was sold at $7.90 per ton, giving a revenue of $1.50 per ton of garbage treated. The contract price for grease was $6.25 per 100 pounds based on 97% saponifiable oils. The tankage was sold at a contract price of $8.10 per ton, based on ammonia, 3.45%, $2.02 per unit; bone phosphate lime, 4.70%, $0.10 per unit; and potash, 1.10%, $0.60 per unit.

New Type of Refuse Incinerator

A type of incinerator which is believed to be new has been developed at Glasgow, Scotland, by J. S. Atkinson, the inventor. His original idea was probably suggested by the rotary cement kiln and consisted of a cylinder about 5 feet in diameter and 16 feet long, lined with cast iron grates. The cylinder revolved like a cement kiln and was tipped slightly, the refuse being admitted at the upper end and gradually working to the lower end, where it fell out in the form of clinker. The speed of rotation was about one revolution in 3 minutes. Air was forced into the cylinder under the grate bars and passed through them. In revolving, the cylinder carried the refuse partly up one side, when it dropped back, which resulted in a churning action. It was said that about 150 to 175 pounds of refuse could be consumed per hour per square foot of effective grate area. Very high temperatures were obtained and one result of this, which proved a serious defect, was the gradual adhering of clinker to the cast iron lining plates after about one hour of working. It was found that the excessive heating of the lining plates occurred not while they were under the refuse, but while they were above the refuse and received the heat rising from the fuel bed.



NEW TYPE OF REFUSE INCINERATOR.

To solve the difficulty a radical change was made in the construction, although the general operation was the same. Instead of a revolving cylinder, the inventor substituted an inclined grate in the form of a wide endless chain passing around two drums and forming a concave surface between them which serves as the bed for the

fuel. Churning action of the refuse is effected by the continuous slow upward movement of this inclined grate, as in the case of the cylinder, but the grate after leaving the fire passes under it rather than over it. The result is that the fire bars do not become heated above a black heat and there is no tendency for the clinker to stick to them. An additional advantage is that a boiler, preferably a water-tube boiler, can be installed above the grate and the heat be used for creating steam therein. The first of these inclined grates has been installed under a Babcock and Wilcox water-tube boiler. This, we understand, is in the nature of a test plant and it is possible that further developments will be made before it works satisfactorily in all respects.

Refuse Sorting in New York

An experimental plant involving sorting of refuse which is being tried out in Queens Borough, New York, is described by Kenneth Allen, sanitary engineer of the New York Board of Estimate and Apportionment, in a written discussion, in the *Proceedings* of the American Society of Civil Engineers, of the symposium on garbage collection and disposal which is abstracted in the November and December issues of Public Works.

According to Mr. Allen, there are, in all of New York City, 12 incinerators handling garbage and rubbish, 16 handling rubbish only (all of which are in Brooklyn), and 3 handling all kinds of refuse. One of the last is experimental in character, and is being operated by the Brooklyn Ash Removal Co., which owns and operates, under a yearly contract, the incinerators in Brooklyn. "Within the past two or three years, two 100-ton incinerators for burning garbage and rubbish have been placed in operation, while 16 furnaces of about 100 cubic yards capacity per day for rubbish only are situated about the borough. Each of these plants disposes of what remains after picking over 1,000 to 1,500 cubic yards of rubbish per day.

"Each unit is hand stoked and has three grates of a total area of 72 square feet, with corresponding ash pits. Ashes are used for filling land at Corona, in the Borough of Queens. It has been difficult to obtain such complete separation that the garbage and other putrescible and combustible material left in the ashes will not produce a nuisance in the vicinity of the dump. R. G. Collins, Jr., chief engineer of the Brooklyn Ash Removal Company, has therefore devised a plan which may be generally adopted by his company and which is now in operation at a plant at Sutter avenue and Junius street, Brooklyn.

"All refuse, except straight steam ashes, is first dumped into a pit from the pick-up trucks. From this pit it is fed to a moving belt, from which paper, rags, box board, and metal are salvaged and the metal removed by a magnetic separator, the residue being fed from the belt to an Illinois stoker chain grate traveling at a rate of from 30 to 120 feet per hour. The grate surface is 6 x 30 feet. To obtain uniform incineration the material is kept stirred and evenly distributed by two "agitators" consisting of water-cooled pipes rotating slowly in a direction opposite to that of the grate, as spokes on a transverse horizontal axis. A forced draft applied to tuyeres spaced two feet apart under the grate insures complete incineration without auxiliary fuel. The residue is received at the end of the grate and removed in a lateral direction by a drag scraper delivering to a car or truck. As observed, this residue was fine ash without clinker, and contained some cans and small metals that escaped removal. Furnace gases pass through an old furnace improvised as a combustion chamber and then to a 100-foot steel stack screened at the top. This plant takes about 50 cubic yards per hour, the weight per cubic yard varying from 300 to 400 pounds in summer to 900 to 1,200 pounds in winter.

"Advantages claimed for this type of incinerator are: 1. The ability to destroy the putrescible and combustible material received with the poorly separated pick-up collections, thus avoiding a nuisance at and near the dump; and consequently 2—the necessity for separation; and, 3—complete incineration with salvage of valuable material and a minimum of manual labor."

California Highway Notes

Dust-laying experiments. Smoothing rough pavements.

Extensive experiments have been carried on in Division IV over a considerable period in an effort to find an economical means of combating the dust nuisance on unpaved roads, of which there are approximately 140 miles in the Division. The Skyline Boulevard, leading south along the coast from San Francisco, for example, has a crushed rock surface and is graded to widths of 30 and 40 feet. Counts of traffic on this road over a sixteen hour period on Sunday, July 18th, 1926, showed a total of 11,992 vehicles passing Station 55-1, and 5,707 at Station 55-2-A.

To handle such traffic over unpaved roads without controlling dust is a serious problem. As early as 1922 Division IV began experiments with calcium chloride as a dust preventive, when it was tried on two miles of graveled road on Route 8, and on a mile on Route 14. The following season calcium chloride was applied to heavier traveled gravel and crushed rock roads with varying success. In locations where humidity was low, the results were far from satisfactory, and studies were begun in an effort to find a more satisfactory and economical method.

In June, 1924, a section of the Pacheco Pass road was treated with fuel oil for a width of 21 feet, at the rate of 1-9 gallon per square yard of surface; and, in August, the adjoining sec-

tion was treated with magnesium chloride, which was furnished for the experiment without cost by the Leslie Salt Works of Redwood City.

Observation of both palliatives indicated that, under the conditions encountered, the fuel oil was the more effective. This influenced a decision to try fuel oil during the 1925 season.

After considerable thought and study, it was decided to apply to the mulch surface of the road a fuel oil of low asphaltic content at the rate of 1-3 gallon per square yard, per season, in three applications of 1-9 gallon each. The first application was made in May. Subsequent applications were made as the roads became dusty.

Preceding each application of oil the mulch was evenly distributed over the road surface, which was again dragged immediately after the oiling to thoroughly mix the mulch with the oil. This treatment gave traffic a practically dustless road during the time the oil was active. The period between applications varied with climatic conditions but was generally from five to seven weeks.

Oil was applied under pressure by an asphaltic oil truck distributor, which covered from five to twelve miles of 21-foot roadway daily, depending upon the necessary length of haul of the oil.

The cost of this type of work varied with the market price of oil and the freight rate to the various destinations. A fair average for Division IV would be approximately $100 per mile for an application of 1-9 gallon per square yard, or about $300 per mile per season.

The 1925 fuel oil experiments were so successful it was decided to follow the same plan during the 1926 season.

In order to obtain a more lasting effect, we have, this season, made heavier applications of fuel oil containing a high percentage of asphalt. On 5.5 miles of the Skyline Boulevard ½ gallon per square yard was applied in two equal applications of ¼ gallon each.

Applications of asphaltic road oils also have been made to the broomed base of graveled or crushed rock roads. One ¾ mile stretch was treated in June, 1925, with Gilmore 90-95 road oil at the rate of 0.40 gallons per square yard, and about one mile was treated with Grade E asphalt of 200 to 250 pentration at the rate of 0.45 gallons per square yard.

Both of these sections now have the appearance of an oil macadam pavement, and since their treatment little maintenance has been necessary on the traveled highway.

Division VI has been using a Killefer disc on rough asphalt pavements. A vialog reading on a seventeen-mile section showed 18.5 inches per mile of roughness, which compares favorably with many new pavements. A two-ton caterpillar tractor equipped with a rubber track provided the motive power for operating the disc.

South of Bakersfield, the maintenance forces of the Division have been using a Wheeler planer to reduce the ridge which formed against the concrete shoulder by reason of the excess of high-penetration asphalt used in the old asphalt surfacing and seal coat. The material removed is deposited outside the concrete shoulder where it forms an oil shoulder from one to two feet in width.

Lightning and Pavement Reinforcement

An unusual effect of lighting upon a reinforced concrete pavement has been reported (in the "Proceedings" of the American Society of Civil Engineers) by Winston E. Wheat, chief engineer of the Department of Roads and Bridges of Escambia county, Florida. An 18-foot reinforced concrete pavement near Pensacola was struck by a bolt of lightning and the pavement was afterward examined by the writer and B. D. Howe, assistant engineer of the Louisville & Nashville Railroad. It was found that the lightning traveled along the pavement for a distance of 1500 feet, or about 780 feet in each direction. No damage to the pavement was evident except at the expansion joints, which were located at thirty foot intervals "where a gap of about 4½ inches between the ends of the longitudinal wires of the steel mesh reinforcement evidently formed an arc, suddenly generating heat sufficient to break out a small piece of concrete and scattering the aggregate for a considerable distance. Where the wires were bared, the galvanizatiton was found to have been burned off. In all cases the ⅝ inch asphalt expansion joint was melted away at the point of break." The current presumably followed the steel wires of the mesh to the steel bar parallel to and 4 inches from the expansion joint, followed this to the end of the bar and jumped to the corresponding bar on the other side of the joint.

"At each joint over the affected area only a small piece of concrete was broken out or cracked, usually in a triangular shape at the corner of the slab, this piece being about one square foot in area and extending slightly below the level of the reinforcement, which was two inches below the surface." In nearly all cases the pieces so broken were on alternate sides of the road, as if the lightning had traveled diagonally across the reinforcing mesh in each slab. Another peculiar feature was that in most instances the concrete was broken only on the eastern side of the joint. Mr. Wheat states that this may be explained by the fact that the road was constructed from east to west and in laying the mesh the ends were placed at varying distance back from the expansion joints, the exact amount depending upon the overlapping of the sheets of reinforcement in the slab. The reinforcement consisted of standard steel wire mesh weighing 44 lbs per 100 square feet and of three-quarter inch round steel bars placed parallel to and four inches back from the expansion joints.

It might be thought that lightning, striking a pavement, would choose the shortest way to the earth and go directly through the slab. The failure to do so in this case may be due to the fact that the subgrade is pure beach sand which was dry at this time, the water level having fallen to a considerable distance below the surface.

Snow Removal in Detroit*

Equipment owned and hired. Obtaining and directing labor. Preparing a snow map. Methods of snow moving and snow removal.

During the winter of 1924-1925 Detroit spent about $35,000 for snow handling, with a seasonal snow fall of thirty inches; the maximum 24-hour fall having been five inches, and the greatest depth on the ground eight inches. During the season of 1925-1926, all snow fall records since 1885 were broken and the city spent over $121,000 in snow handling; the greatest fall in 24 hours that winter being nine inches, and the greatest depth on the ground nine inches. These figures show a greater cost per inch of snow fall last winter than the winter before by about one-third, which is accounted for by the fact that more area was cleaned. Main arterial highways and crosstown streets as far out as four to six miles from the center of the city were not only plowed but were "picked up" (snow removed from the street) to provide needed traffic area. With each year the tax payer wants and needs more and better service and greater conveniences in the use of his streets; and as he is willing to pay the bill, it is the function of public officials in charge of work of this kind to see that he gets what he wants.

EQUIPMENT

In addition to street car traffic, Detroit has city-owned coaches or small buses, 364 privately owned buses, 700 outlawed but very active jitneys, and approximately 250,000 privately owned passenger autos. There are also about 40,000 trucks and trailers.

The city owns three belt conveyor snow loaders, one of which is equipped with a side loading attachment; two truck-mounted cranes with special light weight 1½-yard snow buckets; 13 plows for mounting on 5-ton trucks; 1 ten-ton and 2 five-ton Caterpillar tractors for heavy plowing; 7 one-man Fordson graders, which can be used for plowing work, in addition to truck plows.

The city has endeavored to be conservative in its purchase of equipment, recognizing that two or three weeks usage a year is about all that can be anticipated in snow service. It has, therefore, endeavored to get equipment which may also be used for work other than snow removal, so that it may be considered a year round investment.

It has found it more expedient to rent trucks for its major requirements than to purchase and operate them. The Employment Department keeps a list of private trucks that can be called at any hour of the day or night and from which a fair percentage will report for work promptly. In addition to extra trucks, many of the cities' alleys trucks, which are worked during the day, are provided with double crews and report on snow work during the night. There are also a number of truck owners who are accustomed to applying for snow work at the White Wing headquarters in the center of the city.

Preliminary to the snow season, all the equipment is carefully gone over and put in first class operating condition so as to be ready for use at a moment's notice. Snow loaders and cranes are the last to receive attention, as they are utilized throughout the year loading and digging in connection with street and sewer construction.

LABOR

For labor, the Department depends on a so-called floating element which seems accustomed to apply for this class of work in large numbers during snow storms. Last winter there were employed as high as 815 men and 156 trucks on the night shifts, and 193 men and 105 trucks on the day shifts. Many are poorly clad and quit by midnight on account of wet feet, but will readily stay through till morning on the coldest night if the feet are kept dry. Bonfires for warming the men are prohibited. These extra men are taken into the White Wing building in lots of about 200, which is the capacity of the general assembly room in the basement. Their name and address is entered on the payroll and they are given a card. They are taken out in squads of 20 under a foreman, the men passing through a railed runway where their cards are punched for the time of employment and each man is handed a low priced shovel. The foreman takes his squad of 20 men to the point assigned to him for work, and during the job punches the card of each of his laborers once an hour. This system, like any other, is beatable, but its weaknesses need not be advertised. It is simple, and after many years of usage seems as good as any for Detroit. The men are paid, at the rate of 55 cents an hour, at 10:00 o'clock on the day succeeding that on which the work was performed, at the central White Wing headquarters.

The forces are divided into two shifts, a day and a night shift of ten hours each, with a one-hour interval for lunch. The day shift works from 7:00 a.m. to 6:00 p.m., the night from 7:00 p.m. to 6:00 a.m. Each shift is assigned to one of the division superintendents, under which is a superintendent of equipment on the night shift and assistant superintendent of equipment on the day shift; the night work being by far the heaviest and most effective.

Equipment operators for loaders, cranes, plows, tractors, etc., are carried over from summer operation on street sweepers, flushers, and

* From a paper by G. R. Thompson, superintendent of the Division of Municipal Waste of Detroit, before the American Society for Municipal Improvements.

similar equipment. The time of these operators between summer operation and snow cleaning is utilized, with some reduction in force, in overhauling and repairing the equipment which they drive, thus giving the better men an all-year-round job and giving the city steady, skilled operators, who are the better operators for doing much of their own repair work.

During the snow period the switch board is manned night and day by an operator who receives incoming calls from machine operators and foremen assigned to snow work. A list of foremen for snow cleaning is made out in advance of the season and these men are instructed to call up in case of a snow of any magnitude. They are selected not only for their fitness for this class of work and their physical ability to stand long, cold hours, but are also selected from those districts that will suffer least by their absence from normal duties.

PREPAREDNESS

Part of the preparation for the winter's work is preparing a snow map or revising that of last year. This is a map of the down-town section of Detroit comprising about 40 miles of streets and includes the legislative, financial, hotel, shipping, retail and theatre districts, which area Detroit considers it necessary to first clean free of snow. This map pictures for the superintendent in charge of each shift, the route for his snow loaders and hand gangs, and location of available dumps. It also shows a considerable area of public sidewalks, together with safety zones, important pedestrian street crossings, and all sidewalks within street intersections that must be cleaned. It is assumed that a 3-inch snow fall can be cleaned from all of the area shown by this map within twelve hours, using the department's available equipment and operators supplemented with 400 day laborers.

Very great assistance is obtained from the United States Weather Bureau, which gives the department advance notification of what to expect in the way of temperature and precipitation. Contrary to public belief, the predictions of the Weather Bureau are almost always correct. Without weather forecasts, snow cleaning can not be done economically or intelligently. The amount of precipitation governs the size of the job and is a determining factor in deciding how many men and trucks to employ. The temperature is an important factor in determining

PART OF DETROIT SNOW MAP

Map of part of Detroit's downtown section, showing program of snow removal. Lines with circles indicate machine cleaning; numbers in the circles, the number of the gang; and arrows, the direction each gang is to move. Lines with crosses indicate hand cleaning; the numbers, the number of the gang assigned to that block. Flat diagonals (at top of map) indicate "plow to curb." Concentric circles indicate disposal points. N P means no parking; 1 H P, one hour parking; M P minutes parking; F D R, Fire Department route. The actual snow map gives street names, and nature of building on each block, as "Shopping," "Office," "Warehouse," "Hotel," "Banking," etc.

not only how much work may be necessary but how it should be done. Wet snow requires prompt opening of the gutters on a rising temperature while dry snow with a falling temperature may be plowed to the gutter and picked up afterwards, open gutters not being essential.

METHODS OF SNOW HANDLING

As to principles of snow treatment, Mr. Thompson hesitated to make any recommendations other than that each storm should be carefully diagnosed in respect to the kind of weather anticipated. Much money can be saved on heavy automobile traffic streets at the beginning of the snow season by allowing the snow to mush up under traffic while keeping the gutters and catch basins open. On the other hand, much money can be lost by allowing snow to freeze in and having to pick it. In some parts of the city, such as outlying portions of main arteries, snow may freeze into the gutter before labor or equipment can be withdrawn from the heart of the city to remove it. Detroit has tried ice plowing with variable degrees of success and the general conclusion to date that there is no machine on the market that will successfully remove ice frozen tight to the pavement. If the ice is appreciably rotted or thawed away from the pavement, it may be scarified or plowed. In one case last winter, Mr. Thompson used salt in advance of a ten-ton Caterpillar tractor and special scarifier with a fair degree of success.

In addition to those sections of the city where snow must be removed, there are many miles of main arteries where it must be moved to one side so as to permit the movement of traffic. Many traffic arteries carry car lines, in which case the street car company plows the snow off of the tracks, from which point the city truck plows, operating one, two or three plows abreast as the width of the street may require, plow the snow over to the gutters. This provides for moving traffic, but not for parking. This method may become quite expensive in case a thaw followed by a freeze occurs before the snow can be picked up after the down-town section has been cleaned. Some streets and boulevards have a lawn between the curb and sidewalk, and the snow may then be plowed over the curb on to this lawn.

In general, all snow is plowed from the center of the street toward the curb, and just in advance of the pick-up machines a gutter plow is sent through so as to windrow the snow out for 3 to 5 feet from the curb. With a windrow about 4 feet high, trucks were loaded last winter at the rate of 10 cubic yards per minute. "The use of the belt conveyor type of loader preceded by plows windrowing the material has proven the most successful and economical method Detroit has found for snow removal. It eliminates practically all unskilled hand labor, is continuous in operation, and involves only simple machinery that almost any of our operators can handle. Loading by crane involves hand piling and cleaning. The crane requires a highly skilled operator and as the city does not normally double-shift its cranes throughout the year, such operators are not readily available for the short emergency period in winter."

Snow cleaning suffers more seriously by reason of parking than any other branch of street cleaning. Taxi drivers and the general public will gladly move their machines from the curb providing the driver can be located but the driver of a private car who parks until 3:00 o'clock in the morning on a main artery in the heart of the town is difficult to locate. The consequence is either an immense amount of labor used to move machines or an unfinished job of snow cleaning in passing parked autos with the loaders. Last year the police posted "No Parking" signs, but these were not taken seriously by the citizens; however, with additional police assistance this year it is hoped that parking will be less of an interference than it was last.

Sidewalk cleaning by the public in front of their premises generally destroys to some extent the work done by the department during the preceding night, the snow from a width of 20 feet shoveled into the gutters making them look as though they had not been cleaned and requiring going back over the work by hand. However, property owners cannot be expected to clean sidewalks in the middle of the night.

Open Roads for Winter Traffic*

Two-thirds of all the motor vehicles in the world are registered in the thirty-six snow states. Brief statement of highway snow removal problems and consideration of the equipment adapted to prevention of drifting and to keeping highways open for traffic.

By H. G. McKelvey†

Snow removal from rural highways continues to grow in popularity and activity in proportion that the traveling public and business interests come to realize the innumerable benefits possible from open roads during the winter seasons. Highway officials representing the thirty-six snow states report to the Bureau of Public Roads that the roads cleared in terms of mileage during the past winter were increased approximately 50 per cent over the roads cleared during the winter preceding; and the same officials report

* Furnished through the courtesy of the Bureau of Public Roads.
† Of the Division of Construction of the Bureau.

a still more extensive program for the approaching snow season. During the winter under discussion—1925-1926—there was greater than one-third million miles of paved roads in existence over the thirty-six snow states; and more than sixteen million, or 66 per cent of all the motor vehicles on the globe, were under registration in the same territory. Neither the first cost of the paved mileage quoted nor the amount necessary for its maintenance is available, but the purchase cost of the motor vehicles exceeded fourteen and one-half billion dollars, and over four billion dollars are required annually for their upkeep. With this improved system of highways and enormous sums invested in motors, the public is demanding more miles of open roads for winter traffic year by year. It is apparent that snow removal work will not have reached its greatest magnitude until nearly all paved roads and their connecting links are kept clear the year round. When this is done the public throughout the snow area with their improved highways and vast fleet of motor vehicles may benefit alike with other sections of the country.

SNOWFALL

Winter maintenance organizations surely have enough snow to contend with at times, but the depths of individual snowfalls are often greatly exaggerated. After a storm, with the immediate landscape covered and snow everywhere, it is concluded that 8, 10 or 12 inches of snow has fallen, while as a matter of fact, probably less than half of those depths actually occurred. From a study of United States Weather Bureau records compiled from twelve weather bureau stations scattered over the eastern United States in the heavy snowfall area, without paying any attention to storms with snow less than 2 inches deep, it is learned that by far the greatest number of storms deposit snow between two and three inches deep, or between three and five inches deep, with those falling between five and seven inches deep materially fewer in number, and storms with resultant snowfalls of seven to nine inches or greater than nine inches deep, comparatively infrequent. Or, in terms of percentage, 33 per cent of the storms during the four seasons studied, deposited snow two to three inches deep; 29 per cent deposited snow three to five inches deep; 22 per cent deposited snow five to seven inches deep; 8 per cent seven to nine inches deep; and 8 per cent greater than nine inches deep. The stations from which these data were compiled were selected more or less at random, but care was employed to avoid mountainous regions.

DRIFT PREVENTION

If snow would lie as it falls, little effort generally would be necessary to remove it from the roadbeds and keep arterial and lateral highways open the year round for the ever increasing wheel traffic. With snow falling but rarely to a depth greater than nine inches in non-mountainous regions for individual storms, were it to spread uniformly on field and road and remain in that laminated state, the only equipment necessary for its removal or displacement would be the simply constructed and low priced straight blade plow, used in connection with the high speed trucks; or, in numerous instances, none other than the ordinary maintenance equipment including road graders and trucks. But, unfortunately, snowfall is usually accompanied by high winds which buffet the light snow crystals about in merciless confusion, and where obstacles are encountered along the highways which break the wind currents, drifts are formed on the travelled way. Consequently, as an ounce of prevention is claimed to be worth a pound of cure, the first problem to be solved in keeping roads open during the snow season, and the greatest one, is the prevention or control of drifting conditions. Snow drifts are formed by

FIG. 1—END VIEW OF SNOW FENCE WITH RESULTANT DRIFT, THE PROTECTED ROADWAY IS AT THE RIGHT BEYOND THE TELEGRAPH POLES.

FIG. 2—VIEW OF THE LEE SIDE OF DRIFT SHOWN BY FIGURE 1, WITH THE ROADWAY COMPARATIVELY FREE OF SNOW.

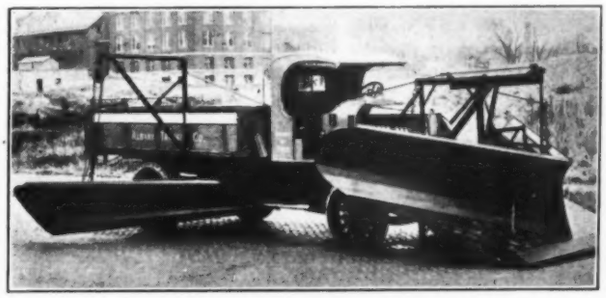


FIG. 3—A DISPLACEMENT PLOW FOR TRUCK MOUNT. One of many designs suitable for truck mount.

FIG. 4—"V" PLOW WITH TRUCK MOUNT IN TANDEM FORMATION, USED BY RAMSEY COUNTY, MINNESOTA.

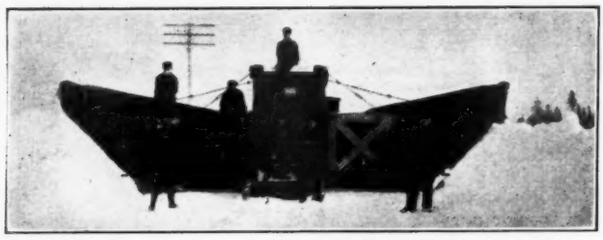


FIG. 5—CLOSE-UP REAR VIEW OF A STURDY DISPLACEMENT PLOW OPERATED BY MARQUETTE COUNTY, MICHIGAN.
The plow is usually hauled by two tractors and the outfit can travel at the rate of approximately five miles per hour. It is usually manned by a driver for each of the trucks, two extra men to handle the wings, and a foreman.

obstacles encountered in the path of the snow laden air currents in the form of high winds. These obstacles break the force of the wind; reduce its velocity; form pockets of still air to the lee of the obstacles; and, due to the absence of air agitation in the resultant pockets or protected areas, permit the snow flakes to fall and remain undisturbed. Drifting conditions are preventable in many ways, but to control the drifts, artificial structures are erected along drift laden sections in such positions as to form eddies on the windward side of the road to be protected and at just the distance away to permit the blowing snow to be deposited between the structure and the road. For convenience, such structures are termed snow fences. Snow fences of various design are employed in all sections of the country when snow drifting is experienced, and without exception are favorably reported for protection of traveled ways when the fences are placed in the proper position relative to the roads involved and in the general direction of the prevailing winds. To locate these drift laden sections of highways, and study the prevalent direction of wind and the topography in close proximity to the traveled way, are the main problems encountered in the control of snow adjacent to rural roads. Taken together these probably represent the most important study in connection with snow removal and drift prevention.

EQUIPMENT

The equipment used in the removal and disposal of snow for the convenience of winter traffic remains essentially the same as that employed during recent winters. The straight blade and the medium size "V" shape plows are used quite extensively when mounted on high speed trucks for keeping roads open, especially where the work is started shortly after the commencement of the storm and persistently followed until the snowfall stops and the program is cleared. For heavier work, in opening drifted or packed sections of roadway, or for widening cuts already made, the more powerful displacement plows with tractors are utilized, or the different types of rotary plows are employed for the same purpose. While some engineers in the heavy snowfall areas believe the tractor plows best adapted for opening roads during and following storms, the majority in both light and heavy snowfall sections believe the straight blade and "V" shaped truck plows the more efficient and economical for quick work. The heavy tractor plows are capable of "opening roads" for winter traffic, but the lighter high speed truck plows can keep the roads open during storms, which is the result desired. A county official of the upper peninsula of Michigan, where there is an average annual snowfall of 99 inches and a seasonal program of 125 miles to keep clear, employs exclusively for initial cuts 36-inch high, straight-blade and "V" plows with truck mounts. These outfits can travel through snow of ordinary depths at the rate of 10 miles per hour and are capable of clearing wide, traveled ways quickly and cheaply. A county engineer in central New York, a locality with considerable snow, has given snow removal careful study and believes that light "V" plows employed with trucks are the most satisfactory for opening preliminary cuts during storms. The trucks carry "V" plows in front and also, attached to one side or the other, auxiliary wings to widen the cuts. Figure 3 is a view of a truck-mounted plow with auxiliary wing used quite extensively in central and northern New York. The Minnesota Highway Department, and also certain counties in that State, use the lighter type of equipment in their snow removal activities. For some localities, however, the trucks are employed in tandem formation; the forward trucks carry "V" plows and the rear trucks have wings attached to their right sides. These outfits are capable of traveling 12 miles per hour while clearing 12 inches of snow. Figure 4 is a view of this type outfit as used by Ramsey County, Minnesota.

The engineers in the localities with truck plows in operation, contend that it takes a fast-moving snow removal outfit to keep ahead of a heavy snowfall and that storms are seldom experienced of such violence as to "snow in" a truck plow unit, provided the truck is in a suitable condition and the personnel efficient. They also report that trucks with plow mounts can travel at high speed while

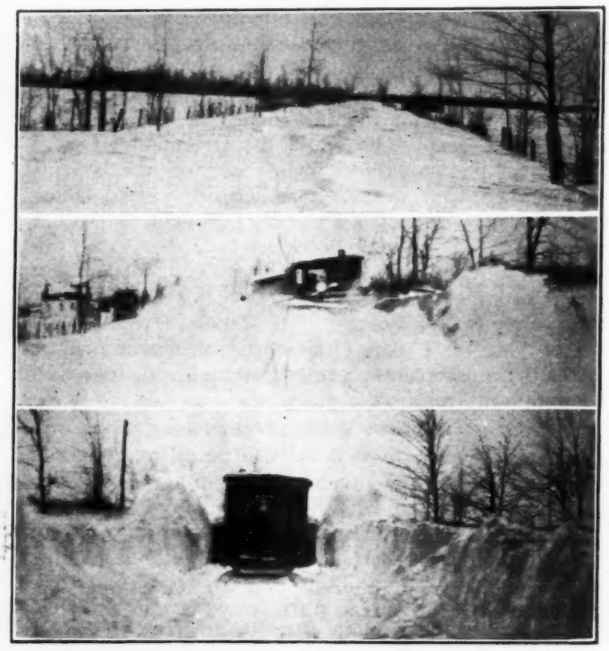


FIG. 6—ROAD COVERED WITH CRUSTED SNOW.
Top—before opening. Middle—Rotary plow opening passage. Bottom—Preliminary passage cleared.

FIG. 7—A ROADWAY CLEARED TO A GENEROUS WIDTH WITH THE HEAVIER TYPE OF ROTARY PLOW.

clearing an ordinary snowfall between drifts and then buck the deeper drifts, but a tractor can maintain but a comparatively slow speed even with little or no snow encountered between the deeper sections. Nearly all of the State officials in the heavy snowfall area of the country report that newly fallen snow to a depth of nine inches, and recently drifted but not packed or crusted snow to a depth of 36 inches over short sections, can be efficiently moved with truck plows. The records of the United States Weather Bureau supply the information that snow falling to a depth greater than nine inches is of rare occurrence, and of those that do fall greater than that depth, very few occur within a single 24-hour period.

From the above facts it appears that the problem of "open roads for winter traffic" at the minimum expense may be solved to a greater or less extent by the effectual use of snow fences and other methods of drift prevention at locations determined after careful surveys, and the employment of as numerous a fleet of the lighter type of plows as the trucks available will permit. The equipment should be placed in action by a carefully selected and efficient personnel at the beginning of each storm, or shortly thereafter, and kept constantly employed in succeeding shifts until the entire program adopted is opened and made passable for all types of winter traffic and in the least time possible.

It is not intended to imply by any means that the heavier type of snow removal equipment is not highly efficient and absolutely necessary for winter road maintenance. The heavier displacement plow as well as the different types of rotaries are surely essential during emergency storms for clearing the initial cuts and are considered indispensable for widening cuts formerly made with any type of plow whatever and also for the opening of such roads in the spring that were not deemed of sufficient importance for inclusion in the regular winter program. The heavier type of equipment at the present time consists of large "V" plows either tractor mounted or tractor hauled, and at least two types of rotary snow plows. These two types are distinguished in one instance by the fans rotating parallel with the line of travel, and the other by the fans rotating perpendicularly with the axis of the road. The lateral type depends upon the power from the tractor mount to rotate the fans, but the front type carries double auxiliary motors to supply power for the respective rotors.

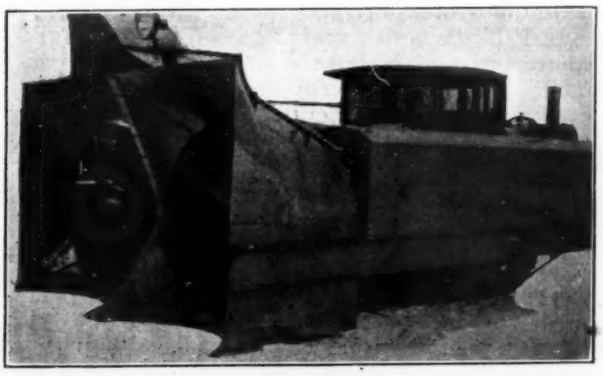


FIG. 8—FRONT VIEW OF HEAVIER TYPE OF ROTARY SNOW PLOW.
The fans revolve perpendicularly with the axis of the plow.

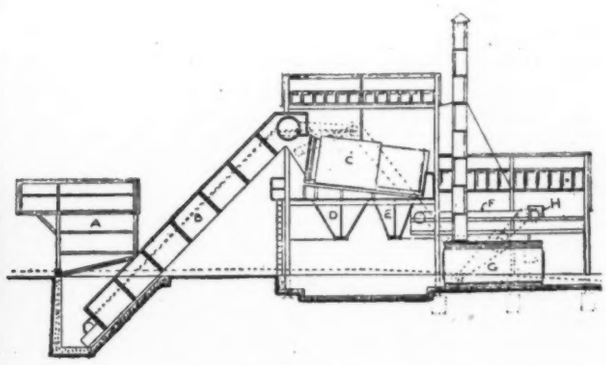
Refuse Disposal at Aylesbury, England*

This plant was opened in December, 1925. For many years past it had been the custom to tip the whole of the refuse collected into a yard adjoining the council depot, and from there it was carted to various lands as they became available. This system caused considerable nuisance and expense owing to the double handling and carting which it incurred. In consequence, the council made an application to the Ministry of Health for the sanction to borrow £3,054, and, on their suggestion, the destructor was erected at the sewage works.

The plant consists of a tipping hopper, electrically driven conveyor or elevator, rotary screen, dust and cinder hoppers, sorting belt, magnetic separator, tin baler and incinerator.

The refuse on arrival at the works is deposited into a ground-level tipping hopper with a capacity of 6 cub. yds. From the hopper it is raised by an electrically-driven elevator of the totally

*From a paper entitled "Municipal Undertakings in Aylesbury" by W. H. Taylor, borough engineer and surveyor, before the Institution of Municipal and County Engineers, England.



AYLESBURY REFUSE DISPOSAL PLANT: LONGITUDINAL SECTION.

A. Refuse feed hopper
B. Refuse feed elevator.
C. Rotary screens.
D. Dust hopper.
E. Cinder hopper.
F. Picking belt.
G. Incinerator.
H. Magnetic drum.

enclosed type, which handles the refuse and discharges it into the overhead revolving screen. The screen is of the double-barrel type, 18 ft. long, 6 ft. diameter; it extracts dust up to 5-16 in. mesh, and cinders from ½ in. up to 1½ in. mesh. The dust and cinders gravitate to storage hoppers situated under the screen. The dust hopper has a storage capacity of 5 to 6 tons, and the cinder hopper 2 tons. Each hopper is provided with a delivery valve having operating gear fixed conveniently for hand manipulation.

The remaining refuse, consisting chiefly of tins, paper and vegetable garbage, is then conveyed on a sorting belt, 30 in. wide by 17 ft. 6 in. long, of vulcanised rubber, to the magnetic separator and incinerator, where the tins are automatically discharged into the baling press, and the paper and vegetable garbage fall to the ground floor in close proximity to the incinerator.

The tin baler produces a bale of 12-in. cube, with an average weight of 56 lb.

The incinerator is a self-contained steel-cased type, and capable of cremating all materials to an innocuous clinker at the minimum rate of 10 cwts. per hour. The incinerator also serves the purpose of cremating whole carcases of condemned meat, mattresses, etc.

To operate the machinery a 12-h.p. motor has been provided for driving the generator (6 amps. 220 volts, speed 1,360 revolutions per minute for magnetic separator), elevator and sorting belt. A 3-h.p. motor for the forced-draught apparatus for the incinerator, and a 5-h.p. motor for the baling press. The electric current is alternating, 380 volts, 3 phase, and 50 cycles.

The ashes obtained from the hopper have been tested and found to contain a dried calorific value of 8,000 B.T.U., and are sold to the electricity department at 5s. per load.

The following is a statement showing the contents and costs, etc., of collection and disposal of refuse for twenty-three weeks:—

Collection, 1,470 tons 3 cwts., or 63 tons 18 cwts, per week.

Contents of refuse:—	Per cent.
25 tons 10 cwts. tins (when baled)	1.73
1 ton 9 cwts. old iron	.10
266 tons 15 cwts, coarse ashes	18.13
248 tons 8 cwts, fine ashes	16.93
74 tons 1 cwt. clinker after burning	5.03
854 tons — cwts. vegetable matter, paper, etc., consumed	58.08
1,470 tons 3 cwts	100.00

Cost per ton of refuse:—	s. d.	s. d.
Labor, collecting	1 10.62	
Haulage, collecting	3 11.36	
		5 9.98
Labor, working of plant	2 7	
Power, etc., working of plant	0 4.08	
		2 11.08
Haulage, removing ashes, etc.	1	.91
		10 1.97
Credits: Ashes and tins sold	1	3.36
		8 10.61
Loan charges	2	0
Per ton	10	10.61

Repair Costs of Rural Pavements*

Annual costs of brick pavements in Ohio one to twenty-one years old, under light and heavy traffic. Importance of subgrade.

By Frank A. Thomas †

At the 1925 convention of the A. S. M. I., Mr. Simpson, city engineer of Columbus, Ohio, read a paper giving figures of the repair cost of city pavements. This paper is similar except that the pavements are rural. The pavements referred to in this paper are from 8 to 20 feet wide, with flush curbs and open side ditches to take care of surface drainage. They are located in Cuyahoga County, of which Cleveland in the county seat. Some of these pavements were rural when constructed, but have been embraced in the growth of communities in the county and have been subjected to municipal traffic conditions. Some of them are the main business streets of thriving communities carrying the very heaviest city traffic in addition to through traffic. In some cases they have been widened, with the old pavements still doing service either in the center or at one side.

The first pavement, built in 1896, was only eight feet wide with a 4-inch vitrified brick cement-grout-filled surface laid on a one-inch sand bedding course. The base was of broken stone 6 inches deep. The curb was of sandstone 4 inches wide and 16 inches deep, set flush with the brick surface. One of several of these pavements built during the next eight years is still in service. In 1903 the standard width was increased to 14 feet and in 1909 the type of base was changed to concrete mixed 1-2½-5 and 4 inches thick. Since 1909, concrete curbs have been used generally but not exclusively. While these were the thicknesses specified, it has been found that some of the six-inch stone bases are really only four inches thick and some of the 4-inch concrete were only three inches or even two inches.

In 1915 the width was increased to 16 feet and some concrete pavements built, and in 1917 asphaltic concrete on cement concrete base was first laid. In 1922 the standard width was increased to 18 feet and in 1923 asphalt filler was substituted for cement grout.

At present there is in service in the county, 2,058,399 sq. yds. of brick, 592,213 sq. yds. of concrete, 349,284 sq. yds. of macadam, and 208,361 of asphalt. Mr. Thomas gave figures concerning all of these, but the relative amounts of pavements other than brick were so small that failures of individual pavements had an undue effect upon the average cost, and only the brick figures will be given in this abstract of his paper.

Of the brick pavements, 4-inch brick was used on 96% of the area and 3-inch brick on the

*Excerpts from paper before American Society for Municipal Improvements.

†City engineer of Euclid, Ohio, and former paving engineer of Cuyahoga County.

balance. Cement grout filler was used on 91% of the yardage and asphalt filler on 9%. Plain sand or granulated slag cushion or bedding course was used on 87% of the yardage, cement-sand 1:3 mix on 3%, and 10% was laid on green concrete base making the so-called monolithic type. Of the total yardage, 18% is on a 6-inch broken stone base, 63% on a 4-inch concrete base, 7% on a 5-inch concrete base, 4% on a 6-inch concrete base, 7% on a 7-inch concrete base, and 1% on an 8-inch concrete base. Steel reinforcing was used on 12% of the concrete base yardage, but the reinforcing was so light that the author called it "binding", as it did not amount to much as reinforcing. Stone curb was used on 25% and concrete curb on 75% of the area.

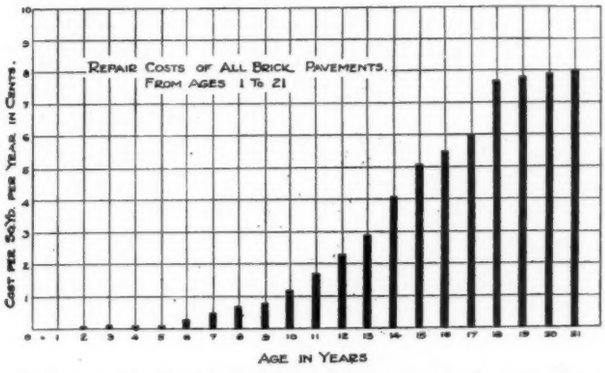


FIG. 1—REPAIR COSTS OF PAVEMENTS 1 TO 21 YEARS OLD

Figure 1 shows the repair costs per square yard per year for all brick pavements. The costs are the average of all pavements regardless of the type of construction or the location, and cover an experience of 21 years of rural highway paving in a rapidly growing locality. It will be seen that the repair cost is low and rises gradually for the first ten years, after which it rises rapidly, and in the twelfth year has doubled. In the fourteenth year it has quadrupled and in the eighteenth year it is nearly eight times as much. After the eighteenth year it runs uniformly for the next three years. It must be remembered in considering the rapid increase in repair costs after the first ten years that the writer is referring to pavements designed and built before anyone could foresee the enormous traffic they would be called upon to carry. The sharp rise in repair costs starts at about the time that the motor traffic began to bring onto the pavements an intensity and weight of traffic never anticipated by the designers.

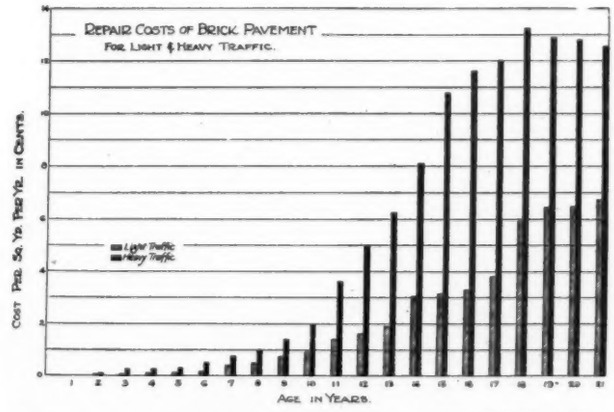

REPAIR COSTS OF BRICK PAVEMENT
FOR LIGHT & HEAVY TRAFFIC.
COST PER SQ. YD PER YR. IN CENTS.
Light Traffic
Heavy Traffic
AGE IN YEARS.

FIG. 2—REPAIR COSTS CLASSIFIED AS TO LIGHT AND HEAVY TRAFFIC

Figure 2 shows the repair costs per square yard per year for brick pavements classified as to whether carrying light or heavy traffic. The decision as to which are heavy and which light-traffic pavements was made from the writer's personal knowledge and whatever traffic data were available.

The repair costs given in this paper are for slab maintenance only. They were determined by taking the amount of money spent for repairs on the several improvements each year and dividing that amount by the total yardage in service during that year. The result was the repair cost per square yard for each year. The cost per square yard per year is the quotient of the accumulated amount of money spent for repairs on any period of years, divided by the number of years in that period.

On 1,524,640 square yards the repair cost for 10 years was 12½c per square yard, or 1¼c per square yard per year. On 1,073,342 square yards the repair cost for 13 years was 38c per square yard or 2.9c a square yard per year. On 680,253 square yards the repair cost for 15 years was 76c per square yard, or 5.1c per square yard per year. On 112,719 square yards the repair cost for 20 years was $1.60, or 8c per square yard per year. One half of the total repair cost was spent on these pavements of early design built between 1904 and 1909. Much of this cost has come from the unexpected heavy traffic. These pavements have a non-rigid base of broken stone 6 inches thick and the yardage is 8% of the total.

Two-thirds of the total repair cost was spent on seven roads having less than 20% of the total yardage, these being the main arteries carrying the heaviest traffic. The repair cost on these seven roads equals 90% of their initial cost. One half of the total repair cost was spent in the 12th, 13th, 14th and 15th years.

Several of the old brick pavements are being reconstructed in 1926 by widening and resurfacing and it is possible to determine the salvage value and the total pavement cost per square yard per year. For example, one pavement is being resurfaced with asphaltic concrete. The original cost of the old brick pavement was $1.81 per square yard, it has given 20 years of service with a repair cost of $1.60. The interest for 20 years at 5% is $1.81, making the total cost $5.22. The salvage value or worth of this old pavement as a base is at least $1.75. The net cost will be the difference or $3.47 for 20 years in service, or 17.4c per square yard per year. At this rate an 18-foot pavement would cost less than $2000 a mile per year.

The pavements which required the most repairs were the heaviest traffic routes on clay soils where faulty drainage undoubtedly was a major cause.

The average original cost per square yard for

all brick pavements was $2.50 and the average original cost per square yard for those built between 1915 and 1925 was $3.42.

There is no doubt that the grout filler in the brick surface added greatly to the strength of these old pavements with thin, weak bases, and was one of the reasons why they stood up so well.

CONCLUSIONS

In the rigid types of pavements, the two things responsible for the bulk of maintenance costs, were, unstable subgrades, inadequately drained, and weak inferior bases. This fact is established by the excellent conditions of those sections of these old pavements that are found on sandy or gravelly soil.

Mr. Simpson, from his studies of repair costs on city pavements in Columbus, Ohio, found a critical period in the life of heavy traffic pavements. This period was from nine to thirteen years. Cuyahoga County's experience seems to prove this critical period to be at about the same time.

However, we must realize in the case of both Columbus and Cuyahoga County, that we are considering a large yardage of pavements that were designed and constructed either before the advent of heavy traffic as we know it today, or during the early phases of this heavy traffic. Whether this same critical period is to be found nine to thirteen years hence in pavements designed and constructed today, is another question.

In conclusion I think it behooves engineers who are designing pavements to put more of the "repair cost" in "first cost" instead of letting some road commissioner put it in later in "after cost."

Water Purification Conference

The second annual conference of West Virginia waterworks superintendents and filtration plant managers was held at Charleston, W. Va., November 12th and 13th and was a signal success. For two days approximately fifty men were present from all parts of the state to listen to interesting talks and demonstrations. As both waterworks superintendents and men who are supervising the operation of filtration plants were present, it was necessary to diversify the program and therefore some papers dealt with the problems which the superintendents meet while others discussed specifically puzzling questions in regard to filtration of water. Considerable attention was focused on corrosion and its prevention and W. A. Taylor, of Baltimore, presented clearly an explanation of the part which hydrogen ion control plays in water purification. Prof. L. V. Carpenter's discussion of corrosion fitted in well with Mr. Taylor's demonstration. Prof. P. D. Strausbaugh gave a stereopticon lecture on troublesome algae in West Virginia water supplies and made an earnest plea for having a study made in that state of the different types of algae, somewhat similar to studies which have already been made in Massachusetts and Illinois, setting forth definitely the algal life in that state.

On Friday evening a dinner was held which was attended by forty-five and at this time a three-reel motion picture, "Your Glass of Water—Are You Sure It is Safe?" was presented, having been loaned by the Pennsylvania State Department of Health. After the dinner Governor Howard M. Gore entertained the conference for an hour or more at his mansion, showing keen interest in the protection of the public water supplies of his state.

Others papers presented at the convention were: "Bringing Your Water Utility Closer to the Public," by A. Bliss McCrum; "Strange Tastes in the Morgantown Water Supply Caused by Industrial Wastes," by W. W. Hodge; "Practical Problems Facing the Waterworks Superintendents in Planning and Maintaining an Adequate Water Distribution System," by Alfred LeFeber; "Railroad Water Supply Problems Encountered in West Virginia," by R. C. Bardwell; "The Aim of the Engineering Department, Public Service Commission," by J. I. Imboden; "Stream Pollution in West Virginia, Is It Increasing or Decreasing?" by A. B. Brooks; "How Industrial Pollution Affects My Water Supply," by A. D. McCormack.

At a clinic on chlorine treatment of water supply, special demonstration of modern equipment was made by manufacturers' representatives.

On Friday, D. W. Evans arranged a simple exhibit setting forth some of the elementary principles involved in the control and purification of water passing through a filtration or disinfection treatment process.

Use of Street Cleaning Machines

In an article under this heading in our November issue, we published some figures as a summary of tables appearing in the same issue, which figures some of our readers appear to have misunderstood. It is apparent from the length of the tables that they included only a limited number of the cities that use street cleaning machinery, and that the number of each class of machine listed therein is only a percentage of the total number in use in the country. For example, in the summary we said: "Of all the cities reporting, . . . 5 cities used vacuum sweepers;" and we are informed that one of the manufacturers of this type of machine has furnished his make not only to three of these five cities but also to seven others—Chicago, St. Louis, Cleveland, Portland, Me., Asbury Park, N. J., Cleveland Heights, Ohio, and Duquesne, Pa.

We would, of course, be glad to present complete figures for all the cities of the country concerning street cleaning, paving, sewers, water works, etc.; but no investigator, private, state or federal, has ever been able to collect complete statistics concerning the public works and services of all the municipalities. It seems probable, however, that data concerning from twenty-five to fifty per cent of the total, embracing cities of all sizes and scattered over the entire country, give a fairly accurate idea of general practices and proportions. As last month's tables included thirty per cent of the number in use of a certain make of machine, it is at least probable that approximately the same percentage applies to other classes of machines and to street cleaning practices throughout the country.

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Preparedness for Snow Handling

It is to be presumed that all northern cities have supplied themselves with such equipment as they will need for handling the large amounts of snow that the squirrels, geese and oldest inhabitants predict for this winter, this including everything from shovels to snow loaders. But there is another matter that is equally important—a program such as is described in the article on "Snow Removal in Detroit" in this issue.

The modern method of fighting snow while it falls allows no time for planning. The superintendent should have his plans so made and his aides so instructed that he can call them on the phone at 3 o'clock in the morning and simply say, "There's nearly two inches of snow on the ground—go to it," and feel sure that each in turn will telephone the truck operator and street cleaner of his gang and the registered extra shovelers and inside of an hour all will be at their allotted work.

Snow fighting is something like fire fighting in that success demands continuous preparedness for instant service at any time. All machinery must be on hand and in perfect readiness and every one know what part he is to play and how to play it. It would be a good plan to have a snow drill at once, every man taking out his machine or shovel and going through the preliminary motions of snow fighting, while the superintendent goes the rounds to see that all men and machines are functioning as and where intended. Night and a blizzard, singly or combined, is no time to find a man or machine that is not where it ought to be because of misunderstood instructions.

Why Sewage Plants Go Wrong

Why some, if not most, sewage plants fail to operate satisfactorily, is illustrated by the experience given by Franklin Hudson in a paper before the American Society of Civil Engineers describing a sewage treatment plant built by him at Stroud, Okla. This plant was designed for a population of 3,000 and consisted of Imhoff tank and trickling filters, with secondary settling tank, and chlorinator. The author states that the plant gave excellent results during eight months that it was operated under his direction. After it had been operating for more than a year an inspection was made and "it was found to be in a condition similar to that of other plants in small towns and for which there seems to be no remedy. The screen was completely clogged, the Imhoff tank partly covered with scum, and all the nozzles on the filter bed had been removed to save cleaning them. At the secondary settling tank the sludge was noticeable on the surface and no chlorine was being used for sterilization. . . . After a general cleaning up, replacing of nozzles and new chlorine cylnder, the plant once again functioned properly."

Individual Water Supplies

A correspondent whose letterhead indicates that he is an architectural engineer has sent us a suggestion for a procedure whereby the size of sewers could be reduced and the citizens could save in their water bills at the same time. His suggestion is that each building provide itself with a tank or other reservoir in one of the upper stories and in this catch the rain water falling upon the roof of the building. This would relieve the sewers of the amount of water which falls upon the roof, and by using this water (which would have the advantage of being soft and therefore well adapted for washing purposes) the occupant would save himself the cost of that amount of water in his water bills.

At first glance this sounds attractive, but a

short calculation would indicate several weak points and also serve to emphasize the fallacy of the argument that water should be "free as air."

If we think of a residence with a roof area of 30 x 50 feet, and assume a rain fall of 36 inches a year, we have the amount falling on the roof equal to 4500 cubic feet a year, or 33,750 gallons. Assuming that all of this water is caught and stored, and that the consumption in this residence averages about 400 gallons a day, this would provide water for 84 days of the year, or less than one quarter of the time. If city water is sold at $1.00 per thousand cubic feet, the owner would thereby save $4.50 a year, which is 5 percent on a construction cost of $90, allowing nothing for upkeep of the tank. To utilize all of this supply would require storage of at least 1500 cubic **feet or about** 50 tons. To support a tank of this weight on any of the upper floors of the building would require a construction costing several times $90. Should the tank be built in the ground, under or adjacent to the house, it is possible it could be built for $90, although this would be a very low cost, but there would then be involved a pumping equipment and the operation of a pump for raising the water or the inconvenience of pumping the same by hand.

Calculating similarly for a large office building 150 feet square, this building would need to provide storage and a construction of the frame work sufficient for holding about 750 tons of water, in return for which the owner would save in water bills less than $100 a year, which saving, as in the other case, would not be sufficient to pay him interest on the additional costs involved.

As to the saving of sewer area, in a residence district the roof would not occupy generally more than 10 or 15 percent of the total area (the streets and sidewalks themselves generally constituting 30 to 40 per cent of the total area), and if all rain falling on it were caught, this would be equivalent to a saving in cost of sewer of possibly 5 percent. If we assume the residence to be on a 75-foot lot and the storm sewer to cost $3.00 a running foot, this saving is somewhere between $10 and $15 per residence in the construction of the sewer; which $10 or $15 saving would not go very far toward compensating the owner for the cost of installing the tank. In the business district the roofs of the large buildings might cover one-third of the total area and the saving would be considerably greater per running foot; but on the other hand, the cost of strengthening the buildings to support the immense weight of the tank on the roof or upper stories would be proportionately very much greater.

Perhaps the most important point indicated by the above calculations is that, for any one to utilize the water which reaches him "free as air" in the form of rain, would require an expenditure several times greater than that which he pays to the water company, while the total amount of water which he could thus obtain would be not more than one-fourth that which modern conveniences and practices seem to make it necessary for him to use.

The A. S. M. I. Convention

Account of the thirty-second annual convention. Business conducted; papers read, and discussions of them, dealing with paving, city planning, sewerage, water supply, snow removal and other topics. Bringing specifications up to date.

The 32nd annual convention of the American Society for Municipal Improvements was held at the Mayflower Hotel, Washington, D. C. on November 8th to 11th. Probably more members registered than at any previous convention and the meetings were well attended and called to order promptly.

The afternoon of Monday the 8th was devoted to meetings of committees, and the evening of that day to the formal opening of the convention.

All of Tuesday and the morning and afternoon sessions of Wednesday were occupied with the reading and discussing of papers and reports.

Thursday morning was the occasion of a joint session of this society with the Asphalt Association, and with the conclusion of this session on Thursday noon the convention ended except for an excursion to the races in the afternoon and an all-day golf tournament on Friday.

The officers elected for the coming year were, C. Arthur Poole, of Rochester, New York, as president; J. B. Hittell of Chicago, Ill. as first vice-president; John Klorer, of New Orleans, second vice-president; and George F. Fisk of Buffalo, New York, third vice-president. P. L. Brockway, of Wichita, Kansas was reelected treasurer, and C. W. S. Sammelman was reappointed secretary. The new finance committee consists of F. Cameron Corson, of Norristown, Pa., chairman; H. Shifrin, of St. Louis and J. W. Reid of Detroit.

Invitations for the 1927 convention were received from a number of cities. The executive committee decided to hold next year's convention at Dallas, Texas. The date, to be decided later, will probably be in the latter half of November.

One hundred and three new members were admitted by the executive committee at the Monday meeting, and a few were added during the convention. Approximately the same number was lost from the membership by deaths, resignation, and dropping for failure to pay dues. The finances appeared to be in a satisfactory condition, the society having paid about $1200 carried

over from last year, and ending with a slightly larger balance in the bank than a year ago while still retaining the thousand dollar liberty bond, which has been held as a reserve.

The Ashphalt Association had arranged to meet at the same time and place and there was more or less visiting back and forth between the technical sessions of the two societies. Owing to the arrangement for bunching the registration of the two societies, enough certificates were received to allow the members to avail themselves of the half-fare return ticket privilege—the first time this has been available to the society for many years.

The program published last month in PUBLIC WORKS was followed quite closely, except that one or two papers were presented which had not been printed in the program, and four of those in the program were not available, one of these being the paper by George A. Parker of Hartford, Conn., one of the older members of the society, who had died only two or three weeks prior to the convention.

No amendments to the constitution were proposed or voted upon at the convention, but the executive committee appointed a sub-committee to study the present constitution during the year and report next year upon a revision which shall eliminate some of the defects which have been found in the operation of the present constitution.

TUESDAY SESSIONS

The first paper was a brief one by E. E. Butterfield, giving further information concerning the experiments being made by him in the Borough of Queens, New York, on the behavior of concrete in sea water. This was a progress report and no final conclusions were presented.

A paper by A. R. Hirst, of New York City, entitled "Recent Development in the Design and Construction of Cement Concrete Pavements and Pavement Bases" was one of the most excellent read at the convention. He emphasized the fact that neither concrete nor any other pavement could properly be called permanent, although some advertising had been calculated to make tax payers believe this; but before we can make real progress in improving concrete we must de-God it, since improperly made concrete has as many faults, if not more, than other paving material. At the present time the point in connection with concrete which needs most emphasis is care in construction. While we argue endlessly about finer details in the specifications, we continually permit omissions of vital construction details.

One of the points emphasized was the undesirability of trying to compensate for poor workmanship or too much water by adding cement. A one to two mortar is rich enough for any concrete. Cement makes for expansion and contraction, and the more cement there is put in concrete the more liable it is to show cracks from contraction or to be otherwise injured by temperature changes. Referring to concrete bases for other paving material, Mr. Hirst insisted that a concrete base needs curing as certainly as does a concrete wearing surface, although engineers who take great pains to cure concrete wearing surfaces will allow a concrete base to lie exposed to the sun with no thought of protecting it against evaporation or conditions likely to seriously injure its strength and durability. In discussing this paper, one member described his method of penalizing the contractors for any deficiencies in thickness or quality rather than relying upon inspection. By making the penalties high enough he succeeded in securing satisfactory compliance with the specifications. He also stated that the slump test was worthless as a field test. During the discussion Mr. Hirst stated that the less mortar there is on the surface of concrete, the better the concrete, and that the coarse aggregate should be so adjusted on the job that the top would just show mortar. George Warren stated that the theory advocated by him some years ago still held true, that the amount of cement should equal the voids in the sand plus ten percent and that the mortar should equal the void in the coarse aggregate plus five percent.

J. F. Pauls, associate highway engineer of the U. S. Bureau of Public Roads, then described the tests of thin brick pavements and conclusions therefrom which were published in the October issue of PUBLIC WORKS, these being illustrated by slides showing photographs of the pavements tested.

A. W. Dow summed up authoritatively the present "Theory and Practice of Asphalt Pavement," which paper was discussed by J. W. Howard and Charles A. Mullen.

Thomas E. Collins, city engineer of Elizabeth, N. J., read a paper entitled "Telford Pavements Salvaged by Resurfacing" which will be published in PUBLIC WORKS.

In the afternoon F. A. Thomas, city engineer of Euclid, Ohio, read a paper on Maintenance Data on Roads in Cuyahoga County, Ohio, summing up classified cost data collected during the past thirty years, showing the costs of roads of different ages and under different traffic conditions. Most of these were brick roads, but there were a few asphalt, concrete and others. This paper also will appear in PUBLIC WORKS.

Under the title of "Snow Removal in Detroit," G. R. Thompson, superintendent of the Division of Municipal Waste, described the methods and appliances used in that city, with the cost of the same. This was followed by a paper on snow loading by J. E. Marson of the Barber-Greene Company.

A paper by H. Eltinge Breed on "Recent Development of Design of Concrete Pavement" was very highly commended and received considerable discussion, especially the parts referring to the use of the water cement ratio, the location and construction of joints, reinforcements, length and width of slabs, and resurfacing old concrete with reinforced concrete, a test pavement of which construction has been laid by New York State.

Arthur Poole, chairman of the Committee of Street and Traffic Lighting, presented a report

describing some of the latest types of installation of street lights. In referring to traffic signals he stated that the amber light was gradually being abandoned except for special purposes such as directing foot traffic or direction of vehicular traffic other than merely "stop and go."

The Importance of Care in Mechanical Handling of Bituminous Materials for Penetration Macadam and Surface Treatment was then discussed by William E. Worcester, special reference being made to the importance of uniformity of distribution of the bitumen.

A paper on rock asphalt, with special reference to the Kentucky sand asphalt, was presented by W. A. Brownfield.

In a paper entitled "Suggested Organization of the Engineering Departments in Small Cities," Prof. Harry Tucker stated that from such information as he had available he concluded that about 10 percent of the municipalities of the country had no engineer, 25 percent had an adequate engineering organization, while the remaining 65 percent had inadequate organizations. He then suggested the size and individual functions of an organization suitable for cities of different sizes.

The evening was devoted to reports of specification committees and representatives in other organizations. Most of the specification committees had no suggestion or only a few to make concerning changes in specifications already adopted or reported. The stone block committee recommended adopting the A. S. T. M. specifications for asphalt and tar filler for block pavements, but otherwise no changes in matter but a revising to improve the form and language of the specifications and the inclusion therein of amendments adopted during the six years since the specifications were adopted. These specifications were ordered to letter ballot. Some minor changes were also recommended in the specifications for sidewalks and curbs. It was decided to discontinue the specifications for wood block pavement, as this type of pavement has practically gone out of use. The committee on specifications for bituminous pavements stated that no objections to the existing specifications had been made by representatives of any of the asphalt companies. A form for municipal contract which had been decided upon by a joint committee of the A. S. M. I. and the Associated General Contractors was then presented and was voted approved for letter ballot.

Reports were received from ten representatives of this society on committees of other societies. Committees C-3 of the American Society for Testing Materials on brick reported that a revision of all the brick specifications was now under way.

Committee D-4 reported the committee reaffirms its stand in favor of screens with round openings for classifying material larger than 4 mesh in size, and that the standard specifications for block for granite pavements was changed to include an alternate standard of block having all dimensions the same as before except the width, which will be from 4¼ to 5¼ inches.

The committee C-1 on cement stated that these specifications had been revised and 37 changes made, eliminating the specific gravity test and raising the breaking strength, but there were still a few points that had not been fully agreed upon and the specifications were not yet ready for adoption. Representatives in the Division of Simplified Practice of the U. S. Department of Commerce reported on the reduction of sizes of paving brick, stating that the 2½ inch brick had not been admitted as standard under the rule of the committee but probably would be adopted next year.

In connection with a progress report on standard manhole frames and covers, Col. Howard stated his opinion that manhole covers in pavements should be flat, because if they are rounded a rapidly travelling vehicle will jump from the summit of the cover and strike the pavement just beyond the manhole, gradually causing a depression there.

The committee on Specifications for Materials for Use in Trackwork and Design of Rails for Use in Paved Streets of the American Engineering Standards Committee reported that tentative specifications for materials had been prepared but had not yet reached the point where they could be recommended for adoption. The committee has finally completed plans and specifications for a 7-inch plain girder rail for use in paved streets, and presented sections of the rail. This committee includes representatives of two companies which manufacture all the plain girder rails used in this country and consideration was given to commercial questions involved as well as the engineering view point. Three weights, 82 pounds per yard, 92 pounds and 102 pounds are provided for and it is believed that they offer sufficient variety to permit adopting them to the general exclusion of the large number of existing sections. All the rails are 7 inches high with a 6-inch base, while the head widths are 2½ inches, 2¾ inches and 3 inches respectively. In addition to the manufacturers, the committee contained representatives from the American Electric Railway Association, the American Railway Engineering Association, the American Railroad Association, Association of American Steel Manufacturers, American Society for Testing Materials, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Municipal Improvements, American Short Line Railroad Association, American Mining Congress, U. S. Bureau of Standards, University of Illinois, and Manganese Track Society. The report of the representative on the International Conference on City Planning gave special attention to street congestion and stated as his opinion that decentralization was the only possible solution.

WEDNESDAY SESSIONS

Wednesday morning session was opened with a paper by P. L. Brockway entitled "Building a City toward Its Plan" and telling of the advantages which he found in having a city plan toward which to work and to which to refer as

an aid in convincing citizens dissatisfied with any special features of proposed improvements. Major C. H. Brown, Engineer of the National Capitol Park and Planning Commission of Washington, then described the regional planning for Washington, D. C. and the surrounding territory.

The relation which should exist between pavement design and traffic movement was clearly presented by E. A. Fisher and figures were given of width of street desirable under certain traffic conditions. In the discussion it was stated that in one city retail shops had objected to streets 100 feet wide or more, presumably because they had found that purchasers would not cross such a wide street to reach the stores on the other side.

Eugene T. Lies, a representative of the Playground and Recreation Association of America, then gave an address urging the necessity for parks and playgrounds for the right development of the youth of the country and healthy recreation of the older citizens. Papers on "Directed Recreation" by F. O. Eichelberger and on "Practical City Engineering" by E. R. Kinsey were read by title. A paper by Henry W. Taylor entitled "Financing, Rental and Amortization of Private Sewerage System at Troy, Pa." described an interesting method of financing a sewerage system where the cost could not be raised directly by the municipality. The sewer system was built by a trustee from funds realized by selling stock subscribed to by citizens, with the arrangement that they were to receive 5 percent dividends to be paid by the city from the income produced by rental of sewer connections; any surplus beyond these dividends to be placed in a fund by which the city is to purchase stock from time to time as the funds are available, the shares to be purchased being decided upon by the wishes of the owners or by lot.

In the afternoon Samuel A. Greeley, in a paper entitled "Notes on Charges for Sewage Disposal," presented a plan whereby the rate of charge for sewerage service would be based on the service rendered, this service being classed under the heads of collection, pumping, and purification. A careful and comprehensive survey was made of all services performed and the cost of each and the relation which these costs bore to the services rendered to individuals, and a procedure outlined whereby consideration was given to each of these in figuring rates.

The creation, advantages and administration of the Washington Suburban Sanitary District were then described by Robert B. Morse, chief engineer of the District.

Separate sludge digestion plants as constructed in two or three Wisconsin municipalities were then described by Jerry Donahue, and the paper discussed by E. B. Besselievre and one or two others. This was followed by a paper by Willem Rudolfs, of the New Jersey Sewage Testing Laboratory, giving results of separate sludge digestion experiments made during the past year. This paper we expect to publish in a future issue of PUBLIC WORKS.

The problem of concrete deterioration, more especially with reference to its use for conduits and in lining iron pipe, was then read by John R. Baylis, recently of Baltimore but now with the Water Safety Division of Chicago. Mr. Baylis discussed at length the chemistry of concrete and especially the changes taking place in concrete after it has set, in an effort to explain surface deterioration of concrete structures after they had been in existence for months or years.

John B. Hawley of Fort Worth, Texas then showed lantern slides and gave names and brief descriptions of hundreds of forms of microscopic life found by him in Texas waters.

The need of metropolitan utility districts instead of the plan now prevalent of separating utilities by artificial political boundaries was then discussed by V. Bernard Siems and discussed by Morris R. Sherrard.

THURSDAY SESSION

The final session of the convention was held jointly with the Asphalt Association and consisted of three papers and brief discussions of them. The first was one by Francis P. Smith on "Construction Details Essential to Effective Hot Mix Pavements", which was discussed by W. W. Horner, A. F. Macallum, George W. Craig and A. W. Dow. Mr. Smith's paper was considered a most thorough and complete exposition of the subject and will be presented more or less in full in PUBLIC WORKS. Mr. Macallum referred to the damage done by chains on wheels, which he considered were no longer necessary on city streets. He also emphasized the importance of uniformity. Mr. Horner suggested the use of a template in order to obtain uniformity of thickness, which was very desirable. Mr. Craig advocated the use of the straight edge and the necessity of keeping the roller going all the time. Also he stated that as the rakers were the most important workers on the job, they should be kept on by contractors from year to year as were their better mechanics. Mr. Dow called attention to the desirability for better weighing machinery, claiming that with the present machinery, asphalt might be chilled while being weighed in the buckets and the complete contents of the bucket might not reach the mixture, while the discharge of sand from the hopper was not always or necessarily cut off at the exact time when the scale indicated that the desired amount had been discharged.

Black Base and Its Place in Standard Specifications was the subject of a paper by Hugh W. Skidmore, who showed a number of slides of such pavements. Col. R. Keith Compton then read a paper on Economics of Salvaging Old Pavements, which was discussed by R. H. Simpson.

Following this paper the members of both societies who wished were taken as guests of the Standard Oil Company of New Jersey to attend the races at the Pimlico Race Track. The golf enthusiasts remained over until Friday when a golf tournament of both societies was held at the Congressional Country Club.

Operating Centralia Filter Plant

Interesting experiences in breaking in a new plant.

Some interesting features a little out of the ordinary which were encountered in breaking in the filter plant of Centralia, Ill. were told by R. S. Rankin, of Pearse, Greeley & Hansen, in a paper before the Iowa Section of the American Waterworks Association.

Centralia has a population of about 15,000. Its waterworks plant includes one of the largest impounding reservoirs in Illinois, and because of this the waters drawn from it have very little turbidity. On the other hand, at times there is more or less trouble from taste-producing organisms. The color is a relatively negligible factor, as there are no swamps on the tributary area. The water is quite soft as compared with other supplies in Illinois. As the total alkalinity ranges from 20 to 80 parts per million, this complicates the chemical treatment and necessitates close supervision over the alum dosage.

The filter plant is composed of an aerator, mixing basin, two coagulating basins, four filters, a clear water reservoir, and a head house which contains office, laboratory, and chemical handling equipment. The plant is rated at a nominal capacity of 3,000,000 gallons per day.

A rather unusual feature is the steam-turbine-driven wash-water pump. Steam is supplied from the boiler room from 240 feet distance through a four-inch underground pipe encased in a special insulating conduit with suitable provision for expansion and removal of condensate. The turbine operates at 3,450 r.p.m. and is connected through reduction gears which operate the pump at 1,100 r.p.m. Even with the relatively infrequent operation, there are economies in the operation of the more expensive geared unit as compared with the slower speed direct connected unit.

ALUM DOSAGE

Due to low alkalinity in the raw water, care has to be exercised in adding the alum in order not to put more in the water than can be neutralized by the natural alkalinity of the water. Daily determinations of the alkalinity are made on the raw and filtered water, which enables the operator to adjust his dosage to meet the varying requirements. As noted previously, the turbidity in the raw water is unusually low for a surface supply, so that the principal requirement of the alum is to aid in bacterial reduction.

RED WATER TROUBLE

Red water trouble, which is more or less common in the Eastern states, is almost unheard of in Illinois and other central states but has been experienced in Centralia during the past year. This trouble is caused by free CO_2 in the presence of dissolved oxygen in waters of low alkalinity, which water has a corrosive action on pipes and plumbing, taking iron into solution which finally appears in water drawn from the faucet. During the summer of 1925 the draft on the Centralia reservoir had been unusually heavy and large areas normally submerged were uncovered long enough to acquire a heavy growth of vegetation. In the autumn, while the reservoir was still low, a great deal of this was removed by burning but much of the stalks and other materials which had not burned remained and when the spring rains came were submerged and naturally began to decay. As a result, large quantities of carbon dioxide were produced and since the water was low in dissolved salts of lime and magnesia, much of the carbon dioxide remained in the water as free CO_2. Tests of the raw water at the plant showed that this ran about 7 to 8 parts per million. Aeration at the plant reduced this to about 2 parts, but unfortunately in the alum reaction with the water free CO_2 is liberated at the rate of about 6.8 parts per million for every grain of alum added. Some of this is removed in the process of filtering but some remains in the filtered water.

The most feasible method of removing the free CO_2 at Centralia seems to be to add lime enough to neutralize it and leave a slight excess which in time would produce a protective coating on the inside of the pipe. Unfortunately, the lime adds to the hardness of the water but this does not now seem to be a serious factor. Later it may be desirable to change to soda ash, which will not increase the hardness but will add some what to the cost. For adding the lime a dry feed machine was purchased, and pipe connections made to introduce the lime at the same point as the alum. The result of this was not satisfactory, probably due to the fact that the alum and lime had a tendency to react with themselves instead of with the desired constituents in the water. The application of the lime was then made at a point about halfway through the mixing basin and the results of this have been all that were expected.

Chemical control of the various steps is maintained, and the aim is to add just enough lime to produce a slight normal carbonate alkalinity in the filtered water. In this way all of the free CO_2 is removed. At present satisfactory results are obtained with the addition of about 0.5 grain of alum per gallon and about two-thirds of a grain of lime in the form of calcium hydroxide or ordinary commercial hydrated lime. Seasonal variations will probably necessitate alterations in the dosage of lime either up or down, depending upon the amount of free CO_2 in the aerated water. Moreover, in order to prevent serious incrustation of the sand grains in the filters, the addition of lime will be discontinued from time to time, thus permitting the CO_2 in the water to react and remove deposits already formed. It may be possible to discontinue the lime treatment entirely when the pipes have acquired adequate protection.

Daily determination of hydrogen ion concentration are also made, but so far no practical use has been made of the results. Longer record will

likely assist in obtaining maximum values for the quantities of alum required.

So far the filter plant and aerator combined have been capable of satisfactorily removing all tastes and odors which have appeared in the water from time to time.

TURTLE TROUBLE

One interesting feature connected with the starting of the plant was the almost complete interference with pumpage by mud turtles. The low-lift pumps functioned satisfactorily for a few days after beginning operation and then the delivery gradually began to decrease and in a very short time both pumps together failed to supply the filter plant. Investigation disclosed that the immediate suction connections to both pumps were found packed with mud turtles which had come through the pipe line from the reservoir. An inspection of the outlet screen at the latter showed several large holes through which the turtles passed. Removal of the turtles and repairing the screen has remedied this situation and the pumps have since operated at required capacity.

All-Western Road Show

Exhibit of road building machinery in San Francisco, in tents and in actual operation, on a demonstration field, surpassing last year's show in size and features.

By C. W. Geiger

The Second Annual All-Western Road Show, held in San Francisco October 7 to 15th, was not only bigger, better and more beneficial than the First Annual All-Western Road Show held last year, but was perhaps the greatest Road Show ever held in the United States.

The popularity of the demonstration field this year was shown by the big increase in the number of firms who had their equipment in action. A feature was the big fleet of Caterpillar tractors that was placed at the disposal of manufacturers of scrapers, subgraders, and other types of machinery. These tractors and the various types of earth handling machinery were given the most severe tests on the demonstration field before the thousands of visitors. A number of ditchers and loaders were also actually operated in digging ditches and other operations, after which the ditches were filled in by a Killefer backfiller, the blade of which is driven from the rear drawbar of the tractor through two heavy side members. As the blade oscillates, the side members are guided by heavy rub-irons situated well to the front of the tractor. The blade and its framework are so mounted that the usual sidedraft is properly offset and the tractor is allowed to move ahead without the annoying tendency to tail. This is accomplished by pushing the blade from the rear.

There was also demonstrated a "Killefer" loader for the contractor who must have a fast and easily handled machine to load his trucks, both large and small. Due to its advantageous size, it works in narrow streets and alleys where big rigs are at a disadvantage. Its lift is high enough to easily reach over the sides or endgate of the largest dump truck. Trucks may be loaded by backing under the loaded bowl or the tractor may be swung round to the waiting truck.

A battery of two Western "Tumble-bugs" was also demonstrated, being operated by a Caterpillar tractor.

There was also a fleet of Fordson tractors on the demonstration field, which were used in operating various types of scrapers, etc. This fleet included a Bell City "Trackpull" crawler operating a scraper; a "Universal" power shovel mounted on a Fordson; a Haiss "Traxion" chassis equipped with a Fordson tractor.

The Cleveland Tractor Company had a working exhibit on the demonstration field in connection with the H. C. Shaw Company of Stockton, Calif. There was a 6-ft. Throop scraper working with a Model K "Cletrac"; an 8-ft. Throop leveler with a Model A "Cletrac"; and a 10-ft. special contractors' pattern leveler.

What was probably the largest and most extensive demonstration of gasoline-driven power shovels ever concentrated at one point was given by various manufacturers on the demonstration field and included the following: Harnischfeger Sales Corporation, Milwaukee, Wis.; Brown Hoisting Machinery Company, Cleveland, Ohio; Northwest Engineering Company, Chicago; Erie Steam Shovel Co., Erie, Pa.; Bucyrus Company, Milwaukee; Marion Steam Shovel Company, Marion, Ohio; Speeder Machinery Corporation, Fairfield, Iowa; Byers Machine Company, Ravenna, Ohio. The Harnischfeger Company had the largest individual exhibit of gasoline driven power shovels on the demonstration field, with a complete all-steel line including a P. & H. Model 600 equipped with a 65 h.p. full Diesel "Atlas" engine operating on fuel costing 50 cents per day. A P. & H. Model 206 equipped with a Williams bucket was in charge of Robert Taylor, Pacific Coast Manager.

The Autocar Sales Service Company, San Francisco, provided a heavy-duty dump-body Autocar for use of the manufacturers of the various gasoline-driven power shovels in demon-

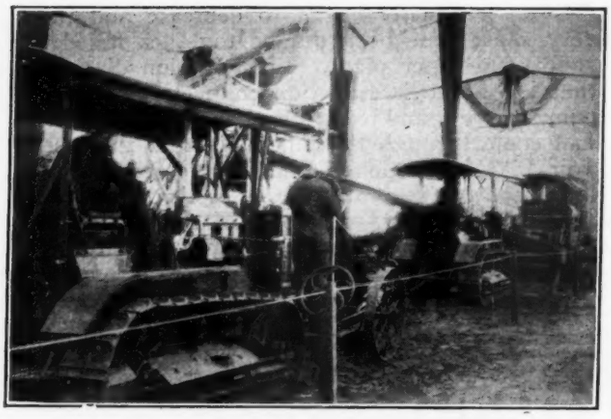


FIG. 1—ONE OF THE TENT EXHIBITS

strating how the various shovels could load the truck with earth picked up on the demonstration field. At the same time, the driver of the Autocar gave demonstrations of how easily and efficiently the loads of earth could be dumped and how the truck could be manipulated in close quarters. Many of the shovels on the demonstration field dug themselves into the ground until they were nearly below the surface of the field.

The Bodinson Mfg. Co., San Francisco, had in operation on the demonstration field a Clausen improved excavator, truck and batcher loader which has a wide range of possibilities.

The Blaw Knox Company, Pittsburg, Pa., had a truck turntable in actual operation.

The Iowa Manufacturing Company of Cedar Rapids erected a Cedar Rapids One-Piece Outfit which was driven by a McCormick-Deering tractor. This crushing, screening and loading plant is a type that is used extensively in providing road surfacing material from gravel deposits. In one operation it conveys material from the gravel pit or quarry ledge, crushes, screens and delivers the finished product direct to storage or loading bin, from which material is always readily available. All material is discharged by the feed conveyor into a double selfcleaning and non-clogging revolving trunion-type screen, an inner screen acting as a grizzley for the outer or sizing screen. Material to size is delivered directly to discharge conveyor which empties into storage bin. The balance or oversize is rejected by the screen to the crusher where it is reduced and elevated back through the screen allowing only material of "maximum size and under" to reach the discharge conveyor and bin.

FIG. 2—ANOTHER OF THE TENT EXHIBITS.
Exhaust pipe extending through tent permitted operation of tractor inside tent.

CONSTRUCTING MODEL CONCRETE ROAD

Perhaps the most unique feature of the Road Show this year was the construction of a complete concrete highway from the rough grading to the finished surface. The road was built to standard California highway specifications by the Edward R. Bacon Company of San Francisco, using equipment for which that company is western representative. The total value of the machinery used in this exhibit was $62,000. It was grouped so as to represent a modern paved highway in the course of construction, the various pieces of equipment being seen in the actual service for which they were intended.

At the beginning of the exhibit a Byers "Bearcat" skimmer was shown doing the rough grading. Following the skimmer, was shown a Baker-Maney scraper. Then came a Jaeger mixer and placing plant building a box culvert. Next came a Ventura scarifier, which was followed by an Adams leaning-wheel grader. A Johnson scarifier did the light scarifying. The above were drawn by caterpillars, the skimmer and grader by a 60, the Ventura scarifier by a 30, and the Johnson scarifier by a 2-ton. A Sterling motor truck, and a Burch spreader No. 3 spread crushed rock on a ten-foot strip, and an Acme roller rolled the subgrade and furnished power for a Carr subgrader. A "Multifoote" paver made a concrete road as per the California Highway Commission's specifications, after which an Ord finisher finished the road. At the end there was shown a 20-foot stretch of completed road.

The booth occupied by PUBLIC WORKS was located directly across from this highway.

Following are other exhibits displayed in connection with the Edward R. Bacon Company, which company had the largest individual display at the entire show: The Rotary Snow Plow Company, Minneapolis, displayed their Model 106 rotary "Snow King" plow, which is used by the highway departments of Oregon, Nevada and Idaho. The exhibit was in charge of F. P. Squire from the factory. The McKiernan-Terry Drill Company of New York operated a model of a land pile driver and a submarine pile driver, which is the type that was used on the Estuary Subway now being constructed between Oakland and Alameda. Several large sized hammers were also shown at this exhibit, which was in charge of Earl R. Evans, factory representative. The C. S. Johnson Company, Champaign, Ill., displayed batch proportioning hoppers, and the Easton Car & Construction Company, Easton, Pa., demonstrated the operations of the "Won-Way," Phoenix and Granby quarry cars, using

an Ingersoll-Rand air hoist in the demonstration. The Barnes Manufacturing Company had a road pump of 100 gallons capacity per minute in actual operation pumping water. The Iowa Manufacturing Company had a rock crusher on skids in operation being driven by a 25 h.p. Diesel engine of the St. Mary's Oil Engine Co. manufacture. The Western Machinery Company, Los Angeles, California exhibited an electric double drum hoist and a single drum hoist with dial indicator and automobile brake, motor drive.

The San Francisco Truck Dealers assembled under a large tent the most complete motorized transportation equipment ever gathered together at one time and place on the Pacific Coast. Equipment to meet the requirements of every commercial haulage problem were in evidence. In addition to the exhibits in the tent, there were a number of trucks in use out on the demonstration field, one of these being the Moreland six-wheel ten-ton special Highway Builder. A great deal of interest was taken by the supervisors and contractors in this truck, which hauls a ten-ton pay load and when loaded has a gross weight of 34,000 pounds, yet conforms to all the California State Highway laws, the equal weight distribution on the four rear wheels leaving a margin of more than a ton under the requirements of the law and the weight per inch of rubber is also far under the legal limit of 700 pounds. It has been stated by various engineers of repute that a ten-ton truck of this type of construction does less damage to the highway than an ordinary two-ton truck with solid tires loaded to a gross weight of 16,000 pounds. The truck is equipped with a 105 h.p. six-cylinder motor with a 4½-inch bore.

This truck loaded with ten tons of crushed rock was driven back and forth over a difficult piece of ground hundreds of times each day of the show and demonstrated that it could be driven 15 miles per hour backwards, which means that in cut-and-fill work in the mountains the efficiency over the old five-ton truck would be increased by 200 percent. Its brakes were demonstrated hundreds of times at the show, bringing it to a dead stop in less than twelve feet with manual effort when driven up to seventeen miles per hour. The brakes are of the self-energising type, five inches wide by 22 inches diameter, on all four rear wheels. The total breaking area is 1320 square inches on the service brakes alone, which is over three times the amount on an ordinary five-ton truck. This truck is equipped with a Wood Detroit heavy duty underbody hydraulic hoist.

The Pacific Coast factory of the Wood Hydraulic Hoist & Body Company demonstrated a special boulder body which they designed and built for use in hauling heavy rocks and boulders in the construction of a dam in California. This has an exceptionally strong structural steel subframe, with unusually sturdy reinforcements and a flooring of special steel plate of spring steel qualifications. It is equipped with a Wood Detroit Hydraulic hoist.

FIG. 4—BARBER-GREENE DITCHERS AND LOADERS OPERATING ON DEMONSTRATION FIELD.

One of the largest and most interesting exhibits at the show included 19 manufacturers of special equipment for Ford products, the value of this equipment being close to $100,000. There were approximately 50 Fordsons and many Ford trucks separately equipped. The versatility of this equipment was an educational feature of value and interest to all. In this exhibit there were several new products shown for the first time. This was said to be the largest display of Fordson equipment ever made at one time.

The Gray Giant Company, Los Angeles, displayed the Gray Giant Road Machine, a tractor, compressor, scarifier, grader and a planer combined, which is being used by a number of counties in California.

An interesting feature of the show this year was the complete telephone system that was installed throughout the tents and grounds. Telephones were installed in the booths (a charge of ten dollars being made for this service), and a switchboard was maintained by the show management in the Administration building to connect with all stations, and incoming and inter-tent calls were handled gratis. A record of outgoing calls was kept by the switchboard operator and a memorandum handed to each station of the charges for outgoing calls at 5 cents per call, or at prevailing tariff for long distance calls. Pay

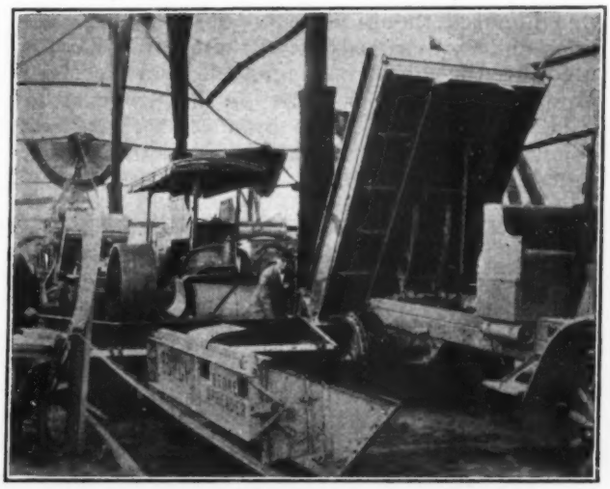


FIG. 3—STERLING TRUCK AND BURCH SPREADERS AND ACME ROLLER USED IN DEMONSTRATION ROAD CONSTRUCTION.

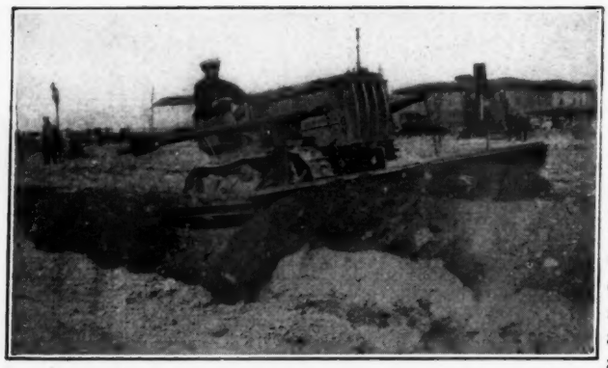


FIG. 5—CATERPILLAR TRACTOR AND HELLIFER BACK-FILLER FILLING TRENCH SHOWN IN FIG. 4

stations were also located at the Administration office.

In each of the exhibition tents there was erected an elevated platform in charge of a page boy. Here there was a telephone installed which was connected with the switchboard in the Administration building. When a telephone call was received for any person, let us say in the Fordson exhibit, the operator would call the telephone installed at the elevated platform in the Fordson tent and inform the page, who would call out the name of the person wanted, using a megaphone. If the person did not respond the page would start out and make an effort to find the man, even visiting the demonstration field. When found, the person for whom the call was made answered the call over the phone at the elevated platform. This was a service that was greatly appreciated by all the exhibitors.

Admission to the show was free, but every person attending was required to register (for which there was no charge), on a card which when properly filled out, was exchanged for a badge which was required to be worn when on the grounds. Exhibitors and attaches wore a special badge.

A number of methods were employed in giving advance publicity to the road show this year. One hundred thousand red seals, 75,000 invitations and 2500 windshield stickers were distributed by the Show management and Western Equipment dealers, as part of the program to stimulate dealers. Radio broadcasts from four population centers, with their far-flung appeals, called to the Road Show.

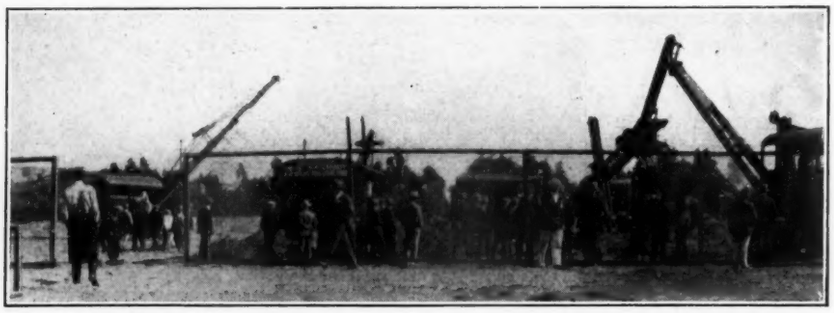


FIG. 6—P. & H. SHOVELS IN OPERATION ON DEMONSTRATION FIELD.

Elimination of Waste

The annual report of Herbert Hoover, Secretary of Commerce, just made public, reports gratifying progress being made in the elimination of waste in a number of directions through the stimulation and guidance of the Department of Commerce. He discusses the subject under the several heads of "Railway Transportation," "Enlarged Electrification," "Utilization of Water Resources," "Reduction of Business Booms and Slumps," "Standardization and Simplification," "Reduction of Seasonal Operation in Industry," "Scientific Research," "Co-operative Marketing," and "Commercial Arbitration."

All of these are of interest either directly or indirectly to all citizens, but several are of immediate interest to those engaged in or connected with public improvements. Among the latter may be included "Enlarged Electrification," "Utilization of Water Resources," "Reduction of Seasonal Operation" and "Standardization and Simplification."

Under the head of "Enlarged Electrification," Secretary Hoover states that in the past five years the electrical generating capacity of the country has increased from over 14,000,000 kilowatts to nearly 24,000,000, an increase of 67 per cent. Although 66 per cent of the energy output is from fuel, the development of water pawer has been very active. "Of the total of 8,300,000 water horse power now developed and connected into the systems, 2,500,000 horse power or some 43 per cent has been set to work in the last five years." This, of course, involves great saving in fuel consumption, but a still greater saving has been made in the more economical use of fuel. "While the electrical output of fuel-burning central stations increased 67 per cent in the five years, the fuel used increased less than 15 per cent. The average consumption of coal or its equivalent by such central electrical generating plants decreased from 3 pounds per kwh in 1920 to 2.1 pounds during 1925, a saving at the average rate of 11,500,000 tons per annum."

Electrical power is being used much more generally in manufacturing and also in the home. The number of homes served has increased in six years from 5,700,000 to over 15,000,000, and the number of farms served is expanding rapidly. "Owing to the economies brought about through central generation and interconnection and through the advances in electrical science, the average price of power throughout the country is now somewhat less than before the War, this being one of the few commodities to be delivered on less than a pre-war basis."

This extensive use of electricity "has increased the productivity of our workmen beyond those of any other country and contributes to our maintenance of high real wages and to the reduction of human sweat; while it relieves the home makers of many irksome tasks and adds immeasurably to home comforts."

Concerning "Utilization of Water Resources," the

Secretary refers to the use of these resources for power, and also as water ways. He states that the streams and rivers "offer us a possible total of 55,000,000 horse power, of which less than 11,000,000 has been developed. Of the 25,000 miles of possible inland water ways, probably less than 7,000 are really modernized and utility of much of these 7,000 miles is minimized by their isolation to segments of what should be connected transportation systems."

Under "Standardization and Simplification" reference is made to reduction in varieties among 51 items, most of which are not of immediate interest to the public works field, but attention may be called to such reduction in vitrified paving brick varieties, is asphalt penetration, in lumber and steel reinforcing bars.

The item under "Scientific Research" which will, perhaps, be of special interest to us is that entitled "Improvements in Aerial Mapping." Attention is called to the advance made in surveying by aerial photography for mapping areas and contours of water sheds, woodlands, etc., as well as of cities. Says the report: "One of the greatest difficulties to overcome is the distortion which the best photographic lenses introduce, especially the lenses used for enlarging the original photograph. The Bureau has succeeded in practically eliminating this distortion without introducing other harmful aberrations, by inserting at the proper place in the camera a plate of glass of proper thickness. This device reduces the flying time in taking aerial photographs to about one-half that necessary before."

Construction Details in Asphalt Paving

Importance of uniformity of mix, density and contour; raking and thorough rolling.

One of the most instructive papers read at the Fifth Annual Asphalt Paving Conference, held in November, was that by Francis P. Smith of New York City entitled, "Construction Details Essential to Effective Hot Mix Pavements." He stated that, owing to the change in the character of traffic carried by roads and streets, asphalt and other pavements were subjected to conditions not only more intense but also different in nature from those for which the older pavements were built, reference being made especially to the push of automobile driving wheels. Fortunately, those pavements had a very high factor of safety and this has been their salvation. However, the changed conditions should be recognized and corresponding changes made in the design and constructional details of such pavements. In most instances it costs no more to lay a pavement in accordance with the best modern methods than to lay it carelessly.

The effective life of a modern hot mix pavement is largely dependent upon: (1) The quality of the mixture. (2) The uniformity of the pavement as to (a) composition, (b) thickness, (c) density. (3) Contour of the finished pavement. Of equal, if not greater importance, are the kind and character of the foundation, subsoil and drainage. Mr. Smith discussed only the necessary qualities of wearing surface and the best methods for securing them.

QUALITY OF MIXTURE

If sand and stone deliveries vary to any great extent, it is impossible to make a uniform mixture out of them. The product of stone quarries and sand pits is far from uniform, and major variations in mesh composition, even if within specification limits, call for variations in bitumen and dust content of the mixture. If the formula remains unchanged, the mixture will vary markedly in physical characteristics and uniformity will be lost even if quality is not impaired. Dirty stone or sand after passing through the dryer frequently has fine dust partly baked on the outer surfaces of the larger grains or particles, which seriously interferes with the proper and permanent adherence of the bitumen to the aggregate.

Temperature is very important. If the stone or sand is too hot it will damage the bitumen more seriously in a short time than hours of moderate overheating of the bitumen in a large kettle. On the other hand, too low a temperature increases the difficulty of properly and uniformly coating the mineral aggregate with bitumen and makes a mixture which it is difficult to rake on the street and impossible to compress effectively. The sand must be thoroughly dried as well as heated. Electrical pyrometers, if properly used, not only indicate temperature but are of great aid to firemen and result in increased output as well as necessary uniformity of mixture. Mr. Smith expects that the future will see widespread development of automatic thermostatic control.

If mixer teeth that are half worn down are kept in service or the time of mixing reduced to increase the output, the result will be a mixture some of the particles of which are imperfectly coated with bitumen and some excessively rich. Such a mixture is especially liable to wave under heavy traffic.

Uniformity is perhaps a greater aid toward retarding wave formation than is generally recognized. A pavement in which soft, rich spots occur surrounded by a notably harder mixture is much more liable to form objectionable waves and lumps than one which is uniformly soft. Uniformity of composition is largely a matter of plant control, and is dependant upon the uniformity of raw materials, accurate weighing and thorough mixing. There is danger of segregation during transit between plant and street, especially by the coarser aggregate. With hand spreading it is possible to correct this segregation by turning the mixture over with shovels before putting it in place, and this should always be done in the case of coarse aggregate wearing surface.

FOUNDATION

The old idea that it was desirable to have the surface of the concrete or other base rough in

order to prevent the bituminous mixture from sliding on it precluded the possibility of laying it accurately to grade. The finished surface was then obtained by making up these inequalities by variable thickness of the asphalt. It would appear to be axiomatic that a bituminous wearing surface of greatly varying depths is more liable to displacement under heavy traffic than one of uniform thickness, and yet it is very difficult to convince engineers of the necessity of fine grading their concrete foundations. Roughness of foundation surface should be made subordinate to maintaining grade and can be obtained by the use of corrugated rollers, vibrating mats or similar devices.

RAKING

Raking is usually done by eye, but a guage would be an improvement. It takes many months to make a good raker out of a man who is fitted for the work and there are few good rakers to be found today. The use of a long-handled screed 4 feet to 5 feet long operated at right angles to the direction of raking after the raking has been completed will correct many of the errors of poor raking. Standing in the hot mixture inevitably causes variations in thickness unless the mixture where trampled upon is "fluffed" up to the same density as the balance of the mixture by the raker.

ROLLING

The density of a pavement is dependant upon both the design and the amount of compression it receives. Rolling should be continued until ultimate compaction has been produced as nearly as possible. Under former traffic conditions no great harm resulted by allowing traffic to give the final compaction, but the danger of such a practice is increased one hundredfold today. Increasing the speed of the rollers to perform more work decreases their compressive effectiveness and tends toward faulty contour. More rollers are required and they should be kept continually in operation. The delays incident to cleaning fires and filling boilers with water have lead many contractors and county organizations to turn to the motor rollers. The clutch mechanism of this type of roller has recently been greatly improved but it is absolutely necessary to maintain it in perfect condition, otherwise the jerks incidental to starting and reversing will be fatal to good contour.

Dense modern mixtures require the use of a heavy roller for initial rolling. After such mixtures have become slightly chilled it is impossible to effectively compress them. Twelve and fifteen-ton, 3-wheel rollers are being increasingly used for this purpose instead of the former five to eight-ton tandem roller. They should be put in use just as soon as the freshly raked mixture will take them and no delays should be tolerated. This precaution is especially essential in cold weather.

If the raking has been poor, honey-comb spots will show after the first rolling due to the fact that the full weight of the roller had not been applied to them because it has been chiefly supported by adjacent humps. These humps must be displaced before the low spots can receive proper compression and that means more rolling will be necessary, and if the humps are large and the street is too narrow to permit diagonal rolling, it is a question whether uniform density will ever be obtained through rolling. When the pavement is subjected to traffic, these partially compressed areas may, under favorable conditions, receive final compaction. If they do not, they will probably ravel out sooner or later, leaving a hole. If they do, a slight depression will be formed which, under heavy traffic and unfavorable conditions, will diminish the effective life of the pavement and increase its tendency to wave.

Uniformity of contour is more important under the present high-speed traffic than was the case some years ago. A straight edge should be used continuously to check up the contour after the first rolling, at which time serious defects are most easily and cheaply remedied. The screed previously mentioned, if properly used, acts as a short preliminary straight edge which is easily and quickly applied to any doubtful spot at the time when the defects can be remedied with maximum ease and effectiveness. Careful levelling of joints should be given close attention, but this is secondary in importance to good workmanship in raking and rolling for the reason that joints occur at intervals only.

Mr. Smith concluded his paper with the following summary:

SUMMARY

In conclusion the speaker would urge recognition of the following facts and cardinal principles.

1. That in all types of highway construction, whether of portland cement or bituminous concrete, the factor of safety and the inherent qualities of the mixtures used are such as to imperatively require the best grade of honest and efficient workmanship.
2. Foundations must be adequate, and no foundation can be commercially adequate without proper provisions for drainage.
3. The slighting of any of the stages of construction work with the idea of remedying it later on is expensive and inadequate and cannot produce a satisfactory result. This applies especially to the strict adherence to established grades for the various portions of the pavement.
4. Apart from designs, uniformity of mixture, density and contour are the three most essential points.
5. **Plant:** Test all materials delivered—control temperatures and mixing periods—accurately proportion ingredients and bend every effort towards sending out uniform mixtures.
6. **Street:** Insist on proper spreading, raking and rolling and adequate equipment and number of men. Require strict adherence to established grades for the various courses of the pavement with special attention to the final surface.

Recent Legal Decisions

ASSESSMENT FOR BENEFIT

The New York Appellate Division holds, Long Island R. Co v. Hylan, 240 N Y 199, 148 N. E. 189, that a local assessment board has no power to assess for benefit through a public improvement any property which as a matter of law can derive no benefit from it. "The Legislature should not be deemed to have intended to grant such power, if, indeed, it could do so without violation of the Constitution. Discrimination in taxation which is palpable and arbitrary amounts to a denial of the equal protection of the law, and even a statute enacted by the Legislature providing for such discrimination is void."

CITY MAY BUILD BRIDGES NARROWER THAN ROADBED

In an action against a city for damage to an automobile from collision with the girder of a bridge, the question was whether the city was negligent in constructing and maintaining the bridge with a girder which extended 2 feet within the curb line of the street. It appeared that the girder served the purpose of a guard rail, and was necessary to give strength to the bridge and to provide clearance on account of the height of the water. The New York Appellate Division holds, Rickhold v. City of Niagara Falls, 213 App. Div. 451, 210 N. Y. S. 676, that "the burden of constructing and maintaining bridges over streams within a city is placed upon the city by statute in New York state. General City Law, Section 20 subd. 9. The construction and maintenance of bridges in a city is a governmental function. The statute does not require bridges to be of any particular style, shape, width or construction. The general rule is that the city must use reasonable care in construction and maintenance, so that it will be reasonably safe for travel and passage. Its size, width and strength must be determined from the use that is to be made of it, the physical situation, and other surrounding circumstances.

"A city is not required to build its bridges as wide as the street. The court will take judicial notice of the fact that there are many bridges and viaducts narrower than the roadbed upon which they are located. It has never been held that such a bridge or viaduct, when constructed by a municipality, constituted a nuisance, or that such construction made the municipality liable for negligence. It has been decided that it is not negligence to build and maintain a bridge narrower than the roadbed. There is no contention here that the bridge was not wide enough to accommodate traffic and answer the purpose for which it was constructed. . . . The city, when it decided to build the bridge, had to determine all questions in regard to its size, design, strength and location. In doing that it acted in its governmental capacity and exercised its discretion. Under the facts in this case it cannot be held to have acted negligently."

MAINTENANCE OF PORTABLE PARKING SIGN IN STREET NOT NEGLIGENCE

In an action against a city for injuries caused by the fall of a portable parking sign blown over by the wind from its position on the curb the New York Appellate Division holds, Van Ness v. City of Buffalo, 213 App. Div. 454; 210 N. Y. S. 641, that it is, of course, the city's duty to exercise reasonable care in keeping its street safe for the traveling public. Under General Highway Traffic Law, Section 15, subd. 1, the city had authority to use portable signs in the street. Such use could not, therefore, be held a nuisance as a matter of law. Whether it was such in fact, so that a failure to abate it would be negligence, was held to depend upon whether the city knew such use was dangerous or might reasonably have foreseen some accident therefrom. The sign was of a type in common use throughout the country, consisting of a round iron base connected by a pipe with a disk, and had been selected by the city authorities. It was held that the fact that this type of sign had been adopted after investigation and as a matter of judgment was not conclusive. Verdict for the plaintiff was held contrary to the evidence on the question of negligence.

DUTY OF SURETY COMPLETING HIGHWAY CONTRACT TO CONTRACTOR

The Circuit Court of Appeals, Fifth Circuit, holds, United States Fidelity & Guaranty Co. v. Worthington & Co., 6 F (2d) 502, that when a surety on a highway contractor's bond, after abandonment of the work by the contractor when one-third completed, assumed the contract with the view of completing it, and took over the contractor's equipment, materials and money, it was the surety's duty to complete the work as reasonably as possible, and without profit to itself. The surety received the contractor's money and property to indemnify itself against loss, and that being accomplished, there remained the duty to the contractor to refund the difference, if any, and there was an implied promise to that effect.

BREACH OF WARRANTY AS TO NATURE OF SUBSOIL SHOWN ON BLUEPRINTS

Where a sewer contractor, in an action for breach of implied warranty arising from false representations as to borings made by the city, alleged that the city knew the real character of the subsoil and deliberately misrepresented it on the blueprints, the Circuit Court of Appeals, Sixth Circuit, City of Lima v. Farley, 7 F (2d) 40, held that the plaintiff was not deprived of his right to rely upon representations of fact because of provisions in the specifications attached to the contract that "the profiles are reasonably correct, but are not guaranteed to be absolutely so," and the results shown by the borings are "plotted on the profiles for the information of the contractor, but are not guaranteed," together with

the statement in plaintiff's bid that he had made such investigation as was necessary to "determine the character of the material to be encountered"; and, if the representations were made wilfully, there was a breach of warranty.

TIME FOR RESCISSION OF SEWERAGE CONTRACT AFTER DISCOVERY OF DISCREPANCY AS TO UNDERGROUND CONDITIONS

The Circuit Court of Appeals, Third Circuit, Passaic Valley Sewerage Comms. v. Holbrook, Cabot & Rollins Corp., 6 F (2d) 721, holds that the failure of a sewerage contractor to rescind a contract until six months after its discovery that the underground conditions differed from what had been represented by the commissioners, did not amount to a waiver of the right to rescind, in view of the magnitude of the work, its difficulties, the hidden substances to be removed, and the possibility that they would change in character with each foot the tunnel was advanced.

LIABILITY ON GOVERNMENT CONTRACTORS' BOND FOR WORK IN SEVERAL DISTRICTS

The Federal Materialmen's Act of 1894, as amended in 1905, authorizes a simple action on the contractor's bond in the district in which the contract was to be performed. The Circuit Court of Appeals, First Circuit, holds that where a contract required work to be done in three districts recovery could be had under the act for labor and materials furnished in all of such districts in an action brought in one of them.

A company extending credit to a sub-contractor for materials agreed that concerns from which part of the materials were obtained should be paid by the sub-contractor ahead of it. It was held that the company did not thereby grant the sub-contractor an extension discharging the surety on the government contractor's bond from liability to it. United States Fidelity & Guaranty Co. v. McNulty Bros., 13 F. (2nd) 78.

COUNTY REQUIRED TO SEGREGATE DAMAGE FOR WHICH IT WAS LIABLE FROM THAT FOR WHICH ROAD CONTRACTOR WAS LIABLE

The Texas Court of Civil Appeals holds, Southern Surety Co. v. McGuire, 275 S. W. 845, that a county is not liable for damages to private property, caused by the negligence of its agents in the construction of a road, but it is liable for damages when it properly exercises its authority to take or damage private property in the construction of a road and the necessary drainage ditches in connection therewith; and it is also liable for damages caused by an improper method of construction when the manner in which its agent does such work is under the authority and direction of the county. In an action by landowners against a county for damages caused by the diversion of water arising from the alleged negligent construction of a highway, the evidence showed that not all of the damage was caused by negligent construction for which the county was liable, but partly by the negligence of the contractors in cutting the ditches so as to connect with a creek. It was held that it was incumbent on the country, in order to relieve itself of liability for the entire damage, to segregate the amount of damage caused by the act for which it was liable.

PROVISION IN PAVING CONTRACT THAT EXTENSION OF TIME BE MADE BY ORDINANCE

Where a paving ordinance provided that the board of aldermen might extend the time for completing the work, but did not state in what manner, and the contract provided for by the ordinance specifically provided that any such extension shall be fixed by ordinance, it was held City of Brunswick 1. Scott, (Mo. App.) 275 S. W. 994, that the extension must be made by an ordinance.

ORDINANCES FOR EXTENSION OF TIME ON PAVING CONTRACT HELD NOT TO REQUIRE STATEMENT OF REASONS

A resolution for paving which called for Hassam pavement, a patented article, a definite thing which the competing contractors fully understood, was held a sufficient description of the material and manner of construction. Empire Trust Co. v. Stepp (Mo. App.) 275 S. W. 982. A reference in the resolution to the specifications on file in the city engineer's office, calling for a Hassam pavement, was held sufficient as a description of the work.

An ordinance authorizing a paving improvement provided for its completion within a specified time unless delayed by bad weather, litigation, other work on the street, or inability to get material. Several extentions were granted by ordinance, but not for any of these reasons. It was held that this would not invalidate a tax bill for the paving, the extensions having been granted prior to the expiration of the original time limit.

CITY NOT LIABLE FOR DAMAGE BY SEWER NOT AUTHORIZED BY ORDINANCE

Where the extension of a sewer was ordered by a city council, by an order made of record, but the extension was not authorized nor ratified by an ordinance it was held, Windle v. City of Springfield, 275 S. W. 585, that the city was not liable for damages to a landowner by the discharge of sewage near his land in the absence of an ordinance authorizing or ratifying the extension.

ORDINANCE PROHIBITING PARKING OF BUSINESS AUTOMOBILES IN PUBLIC SQUARES HELD NOT DISCRIMINATORY

The Texas Court of Civil Appeals holds, West v. City of Waco 275 S. W. 282, that the governing body of a city can absolutely control the use of its streets and prevent them from being used by any citizen or class of citizens for conducting any kind of business, and that an ordinance prohibiting the parking of vehicles operated for hire on any of the public squares of the city was valid, and was not discriminatory as class legislation although it did not prohibit other lines of business from parking their vehicles.

NEWS OF THE SOCIETIES

March 3-5—CANADIAN SECTION, A. W. W. A. Annual meeting at St. Catherines, Canada.
March 9—NEW ENGLAND WATER WORKS ASSOCIATION.
March 23-25—NATIONAL CONFERENCE ON STREET AND HIGHWAY SAFETY, at Washington, D. C.
March 24-25—ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION, Eighteenth annual meeting at Urbana, Ill.
March 29-April 1—NATIONAL CONFERENCE ON CITY PLANNING. Annual meeting at St. Petersburg and West Palm Beach, Fla.
May 17—AMERICAN HEALTH CONGRESS. Meeting at Atlantic City, N. J.
June 7-14—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.
Nov. 8-12—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

AMERICAN SOCIETY OF CIVIL ENGINEERS

At the annual meeting of this society, the society's medals and prizes were awarded as follows: the Norman medal to Harrison P. Eddy, for his paper on "Imhof Tanks"; the J. James R. Crowes medal to Charles S. Whitney for his paper on "Design of Symmetrical Concrete Arches"; the Thomas Fitch Roland prize to H. deB Parsons for a paper describing the Sherman Island dam; the James Laurie prize to William Kelly for his paper entitled "The Colorado River Problem"; and the Arthur M. Wellington prize to Major-General William M. Black for a paper "Waterway and Railway Equivalents." No paper having been presented during the year by a junior member, there could be no award of the Collingwood prize for juniors.

The society has added to its roll of honorary members, the names of William Barclay Parsons and Prof. A. N. Talbot.

On January 20th and 21st, during the annual meeting of the society, the several technical divisions of the society held divisional meetings. Those of special interest to readers of PUBLIC WORKS are the Highway Division and Sanitary Engineering Division; although some of the papers in each of the other divisions dealt more or less directly with public works. The attendance at these divisions varied from about 15 or 20 in the Highway Division to 75 or 100 in the Sanitary Engineering Division.

In the Highway Division, W. W. Crosby read a paper entitled "Economic and Engineering Problems of Highway Location," which was discussed by Charles B. Breed and others. W. B. Catchins discussed bituminous treatment of earth type roads, with special reference to North Carolina's developments. H. Eltinge Breed read a paper entitled "Recent Developments in Concrete Pavement Design," which was discussed by Prof. E. G. Hooper and A. T. Goldbeck.

In the sanitary engineering section, the subject of garbage disposal was taken up by seven papers and discussions thereon, while at the section dinner, T. Chalkley Hatton described the new Milwaukee activated sludge plant. Those speaking on garbage disposal were Samuel A. Greeley, E. D. Rich, Willis T. Knowlton, Arthur Boniface, James A. Burnett, R. K. Davis, John V. Lewis, H. P. Eddy and Kenneth Allen. W. Stanley as chairman, presented a progress report of the Committee on Filter Sands.

The society adopted an amendment making graduation from an engineering school equivalent to four years instead of two years in active practice; and another requiring a junior member to have had four years of active practice instead of two years. These will be submitted to the members by letter ballot, as also two other proposed amendments relating to admissions and expulsions.

Sections

Central Illinois Section. At the annual meeting Dec. 1 the following officers were elected: President, M. L. Enger; vice-president, W. D. P. Warren; secretary-treasurer, G. W. Pickels. C. C. Williams, Professor of Civil Engineering, University of Illinois, gave a short talk in memory of the late Ira O. Baker who died November 8, 1925.

Central Ohio Section. At the annual meeting Dec. 11 the following officers were elected: President, H. F. Schryver; vice-presidents, Walter Braun and F. H. Eno; secretary-treasurer, J. C. Prior. Vice-president Milo S. Ketchum spoke on the activities and aims of the society and the future of the profession.

Cincinnati Section. At a dinner meeting Dec. 7 the section agreed to offer a prize, consisting of the payment of the entrance fee and first year's dues as a Junior in the society to the Senior members of the Student Chapter of the University of Cincinnati.

Dayton Section. At the annual meeting Dec. 14 the following officers were elected: President, J. K. Grannis; vice-presidents, F. J. Cellarius and N. Q. Sloan; and secretary-treasurer, C. H. Eiffert.

Georgia Section. At the annual meeting Dec. 14 the following officers were elected: President, C. A. Smith; vice-presidents, Nisbet Wingfield, S. R. Young; and secretary-treasurer, J. Houstoun Johnston.

Iowa Section. At the annual meeting Dec. 3 the following officers were elected: President, R. W. Crum; vice-president, H. R. Green; and director, O. W. Crowley. R. B. Kittredge was re-appointed secretary-treasurer. A discussion on "County Road Programs" was led by H. R. Green, after which Frank T. Sheets addressed the section.

Kansas Section. At the annual meeting the following officers were elected: President, W. V. Buck; vice-president, P. L. Brockway; and secretary-treasurer, F. W. Epps. An interesting talk was given by William Allen White, of Emporia.

St. Louis Section. At the annual meeting Nov. 23 the following officers were elected: President, S. Bent Russell; second vice-president, James C. Travilla; and secretary-treasurer, Harry E. Frech; member of Joint Council, William C. E. Becker. B. H. Piepmeier, chief engineer of the Missouri State Highway Commission, gave an interesting address on "Highways of Missouri."

ILLINOIS ASSOCIATION OF HIGHWAY AND MUNICIPAL CONTRACTORS

This association held its 19th annual convention at Chicago December 16th and 17th. About 200 contractors, engineers and others attended the open sessions of the convention and 300 were served at the banquet. The annual executive meeting of the association was held on December 17th and the following officers elected: President, Alan Jay Parrish of Paris; Vice President, W. F. Lodge of Monticello; Secretary-Treasurer, Frank L. Shidler of Kankakee. J. F. Gallagher was reappointed executive secretary.

Following the address of President James Cameron, Frank T. Sheets, chief highway engineer, addressed the meeting, stating that the letting of contracts for 1926 had been delayed by legal technicalities involving road location, and that it would probably be March 1st or later before any road contracts were let. S. M. Williams discussed the subject of "Establishing Responsibility in Construction." William McKinley, a Chicago attorney, explained the workings of the mechanics lien law. C. J. Moritz read a paper giving the composite opinions of a number of contractors as obtained through a questionnaire which was followed by considerable discussion by Mr. Sheets and C. M. Hathaway, who explained the policy of the Division of Highways in its relations with contractors. F. C. Coyne, principal of the Midwest Freight Traffic Bureau, delivered an address calling attention to the savings that may be effected by contractors in loading and shipping supplies. A. R. Hirst analysed the business of road contracting and urged contractors to see that it is placed on a sounder basis.

ASSOCIATED GENERAL CONTRACTORS

At the Portland convention this society adopted eight resolutions. 1. Recommending to owners, either public or private, that so long as the present methods prevail in this branch of the surety business that serious consideration be given to the use of other forms of guarantee for construction projects.

2. That members of the Association are urged to establish contacts with responsible groups in the other industries of constructions to discuss the effect of the lien laws upon those industries and to gain their support in modifying these laws, to the end that all groups serving in construction may establish higher standards of business conduct and service.

3. That the Rules of Practice for accident prevention approved by the Executive Board be approved and recommended to the membership for immediate

application in their own business, and that the membership is urged to continue the study of safety methods, endeavor persistently to educate their employees in accident prevention, and compare results with each other so that the frequency and severity of construction accidents may be reduced to the minimum.

4. That full information as to the wastefulness of day labor construction be given to the public and that the enactment of laws requiring operations conducted by public forces to be fully accounted be undertaken in the various states.

5. That the association approves of the statement of principles issued by the Dec. 10 conference on government and industry.

6. That the association approves the Joint Conference standard forms of contract and recommends their use, particularly with the arbitration feature, in both public and private construction.

7. That the members should use their influence locally and nationally to direct the attention of the public to the usually inadequate compensation of engineers and the necessity of proper adjustment.

8. That any increase in cost of labor and materials should be resisted by those engaged in construction and that they should be supported in this effort by the public.

AMERICAN WATER WORKS ASSOCIATION

The nominating committee announces the following nominees for offices to be filled at the Buffalo Convention during the week of June 7th:

For president: Allan W. Cuddeback, engineer and vice-president, Passaic Water Co., Paterson, N. J.

For vice-president: James E. Gibson, manager, Water Dept., Charleston, S. C.

For treasurer: William W. Brush, deputy chief engineer, Bureau of Water, New York, N. Y.

For trustee, Dist. No. 3: Fred E. Beck, chief engineer, Consolidated Water Co., Utica, N. Y.

For trustee, Dist. No. 5: J. O. Craig, superintendent water works, Salisbury, N. C.

For trustee, Dist. No. 7: Theodore A. Leisen, general manager, Metropolitan Utilities District, Omaha, Nebr.

Indiana Section. A meeting of this section will be held March 25 and 26 at Purdue University, Lafayette, Ind.

Montana Section. A meeting of this section will be held April 15 to 17 at Butte, Mont.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATERWORKS ASSOCIATION

This section held its first meeting on January 13th to 15th at Louisville, and elected the following officers: Chairman, Carl E. Davis; Vice-Chairman, W. S. Preston; Secretary-Treasurer, F. C. Dugan. Several papers were read and discussed.

ILLINOIS SOCIETY OF ENGINEERS

The annual meeting of this society was held at Elgin, Illinois, on January 26th to 29th. H. F. Ferguson, chief sanitary engineer of the State Board of Health, spoke of the four epidemics which occurred in Illinois during 1925 due to pollution of drinking waters. G. C. Habermeyer and C. V. Swearingen presented a paper entitled "The Yield of Wells." Charles B. Burdick described a project for supplying lake water to residential towns within fifty miles of Chicago. J. L. Clarke and K. F. Dappert, assistant engineers of the South Dakota health department, explained the malaria and mosquito control work being done in the state; H. E. Babbitt warning that the use of oil on ponds may be fatal to water fowl. Robert Kingery described the Chicago regional plan. Major W. H. Herron described methods used in the co-operative survey of Illinois by the United States and the Illinois Geological Surveys. H. Eltinge Breed discussed the economic value of steel reinforcement in concrete pavements, and A. T. Goldbeck explained the results of research in this subject by the United States Bureau of Public Roads. John M. Egan presented results of tests of brick paving two inches to four inches thick, and George E. Martin spoke on the construction and maintenance of penetration macadam pavement. T. Chalkley Hatton described the Milwaukee sewage disposal plant, presenting moving pictures of the same.

The following officers were elected for the ensuing year: J. J. Woltman, president; W. D. P. Warren, vice-president; and H. E. Babbitt, secrtary.

ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS

An association with the above name was organized in Chicago on January 14th with forty members, the purpose being to collect and distribute technical data pertaining to asphalt paving, encourage and conduct co-operative research work, and act as a clearing house of ideas.

The following officers were elected: President, Hugh W. Skidmore, president of Chicago Paving Laboratory; First Vice-president, Leroy M. Law, chief chemist, New Orleans Refining Co.; Second Vice-president, W. J. Emmons, U. S. Bureau of Public Roads; Secretary-Treasurer, Charles A. Mullen, director of paving department, Milton-Hersey Co.; Chairman General Research Committee, Prevost Hubbard of the Asphalt Association; Chairman, Committee on Voids and Aggregates, W. J. Emmons; Chairman, Committee on Street Operations, W. L. Hempelmann, engineer of the Texas Company.

AMERICAN ASSOCIATION OF ENGINEERS

On November 25th, the Oregon chapter withdrew from the association and became an independent organization, adopting the name North West Association of Engineers. It will take over the employment service formerly conducted by it, and remain in its old quarters and retain its former secretary.

On December 15th, the San Francisco chapter also withdrew from the association and took the name Society of Engineers. Individuals connected with these associations stated that this action was due to the apparent policy of the national organization to strengthen itself at the expense of the chapters.

INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS

The annual meeting of this association was held in Chicago, January 11th and 12th, with about 50 in attendance. The officers elected for the ensuing year were: President, Theodore Eichhorn; Vice-presidents, T. H. Byrnes, Goline Doremus and A. B. Cook; Treasurer, A. J. Paul, Secretary, A. M. Anderson. As has become customary with this association, the meeting was in the nature of a round table conference. Street cleaning costs and equipment and parking were two of the subjects receiving special attention.

OHIO ENGINEERING SOCIETY

This society held its annual meeting February 4th and 5th and elected the following officers: President, W. C. Fawcett; Vice-president, Atlee M. Wise and Curtis C. Lattimer; Secretary-Treasurer, C. L. Van Voorhis.

Among the papers read were three on the subject of highways, by Prof. H. H. Eno, J. R. Burkey and A. H. Hinkle, the subjects discussed being respectively soil investigations by the Bureau of Public Roads and the state highway department, highway bridge improvement, and salvaging old pavements. "Progress in Sanitary Engineering" was the title of a paper by George B. Gascoigne.

SOUTH DAKOTA SOCIETY OF ENGINEERS AND ARCHITECTS

At the annual convention of this society held in Watertown, S. D., the following officers were elected: President, John Berg, state engineer; Vice-president, Dean Crothers of the State College; Secretary-Treasurer, W. F. Cochrane, city engineer of Watertown.

COLORADO SOCIETY OF ENGINEERS

This society held its annual meeting on January 16th, when the following officers were elected: President, F. W. Whiteside; Vice-president, Roy J. Randall; Secretary, C. M. Lightburn.

NATIONAL BRICK PAVING MANUFACTURERS ASSOCIATION

The twentieth annual meeting of this association was held in Chicago, January 14th and 15th. The twentieth anniversary was celebrated by more than 100 manufacturers, salesmen and field engineers. The principal speakers were Thomas H. Macdonald, chief of Bureau of Public Roads, E. F. Kelly, E. J. Mehren and Dr. G. C. Mars.

"Cussing the Government" was the title of Mr. Macdonald's talk. Mr. Kelley discussed the research activities of the Bureau of Public Roads and described in detail its present research in-

to the wearing qualities of vitrified brick less than three inches in depth. Mr. Mehren urged greater effort along educational lines, while Dr. Mars emphasized the need for wider advertising of paving brick.

During the second day there were group meetings of executives, field engineers and salesmen, superintendents and operating managers. The use of thin paving brick was the principal subject discussed at these meetings.

PERSONALS

E. R. Smith, formerly deputy engineer of Walla Walla county, Washington, has been appointed county engineer.

J. P. Broome, formerly city manager of Salem, Va., has been appointed city supervisor of Summit, N. J.

George A. Reed, formerly assistant chief engineer of the Vermont State Highway Department, has been appointed commissioner of public works of Montpelier.

Major Thomas F. Farrell, Corps of Engineers U. S. A., recently instructor in engineering at West Point, has been appointed commissioner of canals and waterways of New York State.

O. N. Hansford, formerly with the Colorado State Highway Department, has been appointed county engineer of Pueblo county.

Charles Kinney, formerly city engineer of Goshen, Ind., on January 1 became city consulting engineer at Mishawaka, Ind.

Walter E. Hassam, for some years street commissioner of Worcester, Mass., and deviser of the Hassam pavement, died Dec. 26, aged 60 years.

J. W. Graham, formerly division engineer with the Ohio State Highway Department, has been appointed city engineer of Chillicothe.

James C. Adams, formerly in the office of the city engineer of Binghamton, N. Y., has been appointed superintendent of sewers of that city.

Milton F. Stein, sanitary engineer, author of "Water Purification Plants and Their Operation," died Jan. 2, aged 40.

Wm. A. Schunk, formerly city engineer of Scranton, Pa., has been appointed director of public works of that city.

Geo. C. Andrews, formerly water commissioner of Buffalo, N. Y., and engineer of the new filtration plant of that city, has resigned.

Frank S. Krug, for 12 years past city engineer of Cincinnati, O., has resigned.

Frank L. Raschig, formerly principal assistant engineer in charge of structures of Cincinnati, O., has been appointed city engineer, succeeding Mr. Krug.

H. F. Clemmer, since 1920 engineer of materials for the Division of Highways, State of Illinois, has resigned to accept a position with the Solvay Process Co.

V. L. Glover, formerly road engineer with the Division of Highways, State of Illinois, has been appointed engineer of materials for that division, succeeding H. F. Clemmer.

Julius Adler, formerly deputy chief of the Bureau of Highways, Philadelphia, Pa., resigned on February 15 to open an office in that city as consulting highway and paving engineer.

J. H. Purdy, senior vice-president of the American Water Works & Electric Co., honorary member of the Am. Water Works Assn. and one of the organizers of the Pennsylvania Water Works Assn., died February 16, aged 77 years.

Leonard Metcalf, consulting engineer, of Boston, Mass., died on January 29. A biographical sketch will be found elsewhere in this issue.

Thorndike Saville, Prof. of Hydraulic and Sanitary Engineering at the University of North Carolina and chief hydraulic engineer of the State Department of Conservation and Development, has obtained a year's leave of absence from both to go as consulting engineer to the Government of Venezuela on water supply and sewage disposal matters.

Harrison L. Ashley, for four years assistant city engineer of North Adams, Mass., has been appointed city engineer.

Matthew S. Murray, engineer in charge of surveys and plans, Missouri Highway Commission, has been chosen as director of public works of Kansas City, Mo., under the new commissioner manager charter, which goes into effect April 10.

E. Clark Cowden has been appointed city engineer of Harrisburg, Pa., succeeding his father who died recently.

Bruce Ellis, formerly member of common council of Los Angeles, has been appointed city engineer of Tucson, Ariz.

Charles A. Halbert, formerly engineer with the Wisconsin State Railroad Commission, has been appointed state engineer of Wisconsin.

Earle Harrison, formerly deputy city engineer of Schenectady, N. Y., has been appointed city engineer.

Walter A. Richards, formerly city manager of Columbus, Ga., has been appointed city manager of Greater Daytona Beach, Fla.

Raymond Whitney has been elected city manager of Royal Oak, Mich.

H. G. Wray, formerly assistant city engineer of Indianapolis, has been appointed city engineer of South Bend, Ind.

Grant Ross has been appointed city engineer of Aberdeen, Wash.

Frederick W. Ford has been appointed city manager and superintendent of streets of Auburn, Me.

U. S. CIVIL SERVICE EXAMINATIONS

The U. S. Civil Service Commission is endeavoring to recruit two hundred engineers and architects who will be needed by the Supervising Architect's office in carrying out a proposed extensive building program. Applications will be received until April 30th for positions of architects, associate and assistant architects, associate and assistant mechanical engineers, and associate and assistant structural engineers. Entrance salaries range from $2,400 to $3,800 a year.

Technical Assistant in Sanitary Engineering—Receipt of Applications for the above position will close March 27th. To fill a vacancy in the U. S. Public Health Service, Cincinnati, Ohio, at a salary of $2,100 a year. Duties consist in carrying on public health engineering work pertaining to stream pollution, sanitary surveys, treatment of water, sewage and industrial wastes, drainage and antimalarial measures, sanitation of milk and shellfish, including elementary chemical and bacteriological laboratory work.

Assistant Surveyor Draftsman—Applications for this position will be received until March 23rd. To fill a vacancy in the Forest Service, for duty at San Francisco, at a salary of $1,500 a year. Duties consist of making of maps and performance of other drafting work, including surveying drafting, under supervision, and assisting when necessary in field work and in preparation of final drawings and tracings.

Associate Engineer, Assistant Engineer—Applications for these positions will close on April 30th. To fill vacancies in various branches of the government service throughout the U. S. Entrance salary for the former is $3,000 with advancement in pay without change in assignment up to $3,600 a year; $2,400 for the latter with advancement without change in assignment up to $3,000 a year. Duties will be in connection with original research or investigation, or design and construction.

Assistant Engineering Draftsman—Recepit of applications for this position will close on March 23rd. To fill vacancy in the Interior Department for duty at Muskogee, Okla., in connection with supervision of oil and gas operations on public and Indian lands. Entrance salary of $1,500 a year may be advanced without change in assignment up to $1,860 a year. Duties are to make or revise tracings of construction drawings showing general designs or details; to make general or detail construction drawings of minor difficulty or importance; to plot notes of topographic, hydrographic or general surveys; to do miscellaneous mapping and drafting, etc.

Assistant Geologist—Applications will be received until March 16th. To fill vacancies in the Geological Survey, Department of the Interior at an entrance salary of $2,500 a year which may be advanced without change in advancement up to $3,000. Duties are to perform, under immediate or general supervision, work in geology and related subjects, such as carrying on ordinary geologic mapping, making and recording geologic observations, studying mineral deposits, identifying rocks, etc., and preparing reports embodying the results of the work done.

(Continued on page 54)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

PARSONS' PUBLIC SERVICE DITCHER

The Parsons Co., of Newton, Ia., which has specialized in trench machinery for 21 years, has recently put on the market a public service ditcher designed and built for the particular purpose of digging trenches for gas and water mains, conduits and small sewers. Some of the features to which particular attention is called are that it will dig extremely close to obstructions such as telegraph poles, trees, etc.; second, will dig from 12 to 24 inches wide and 7 feet deep; third, will handle either sticky or rocky soil; fourth, will stand up under hard digging, day in and day out. It is claimed that it will dig a trench less than six inches from the curb or seven and one-half inches from a line of telephone poles; will dig under sidewalks or between houses or right up to the side of a building.

In many points of design, this ditcher, Model 21, corresponds to others turned out by this company; but an outstanding feature is that the boom can be adjusted to dig trenches either in the center of the machine or in any position off center, without any change of parts.

The conveyor deposits dirt at either side of the machine. It is mounted on full caterpillar traction, the two sides operating separately and permitting easy and accurate steering. It has a road speed of one and seven-eighths miles an hour. It is a one-man machine, with all levers within easy reach of the operator. A bucket cleaner enables the buckets to bring up a full load every trip. It can handle rocky soils, shale and hardpan that could not be dug with pick and shovel.

It is a ladder-type machine with the boom always operating between 40 degrees and 45 degrees, regardless of depth. Power is furnished by a 4-cylinder, heavy duty, 4¼-inch by 6-inch Twin City gasoline engine rated at 40 h. p. With engine transmission in low speed, digging speeds of 12, 19, 27 and 37 inches can be obtained through digging transmission, and with engine transmission in high speed, digging speeds of 15, 22, 32 and 45 inches are obtained. By shifting a sprocket, these speeds may be increased about 75 per cent. This gives a total of 16 speeds. The machine is compactly built, with an average width of 6 ft. 6⅝ inches, which may be reduced to 5 ft. 2 inches by placing the caterpillars under the frame. The working height is 9 ft. 2 inches, or 10 ft. 5 inches with the boom in the highest position. The length varies from 14 ft. 10 in. to 17 ft. 11 in., depending on the position of the boom. The boom is of the box girder type, made up of double channel and plate. The lower end telescopes into the upper section, a worm gear type power hoist being provided for this purpose. Buckets are cast in one piece with teeth inserted and can be furnished 12, 15, 18, or 21 inches wide. The conveyor belt is 18 inches wide and is mounted on a structural frame supported on rollers and can be shifted to deliver on either side.

PARSONS' PUBLIC SERVICE DITCHER DIGGING WITHIN 7¼ INCHES OF TELEGRAPH POLE

CURTIS PNEUMATIC AIR COMPRESSOR

The Curtis Pneumatic Machinery Co. of St. Louis, manufactures a portable compressor to be used as an attachment to a Fordson tractor. When the tractor is fitted with rubber tires it can be run over city streets at speeds up to 15 miles per hour. The compressor is driven by a belt from the tractor, the compressor's speed being regulated by the relative sizes of the pulleys and also by adjustment of the tractor governor.

The usual service pressure is 80 lbs., corresponding to which the compressor displacement is 110 cubic feet of free air per minute and the compressor speed is 550 r.p.m. The pressure, however, can be increased up to 125 lbs. with a displacement of 90 cubic feet and a compressor speed of 460 r.p.m.

The compressor is a 6x6 double cylinder, single acting water cooled, with controlled splash lubrication. The air receiver is 24x30 in., with safety valve and gauge.

The frame which supports the compressor is of riveted construction, thoroughly braced and provided with hooked couplings which fit over the back axle of the Fordson. The wheels and axles are of the same design as used for the front wheels of the Fordson. When the compressor is operating it is supported by two quickly adjustable jack screw legs, and it is then possible to remove the Fordson for use for other purposes. It has its own cooling water system, automatic lubrication and self-adjusting belt.

"RED-HEAD" WARNING BEACON

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently developed a new flashing beacon designed to warn motorists of dead-end streets, heavy traffic intersections and safety zones. It is of the flashing type and embodies the mercury contact flasher recently developed by the engineers of that company.

It was believed that the ordinary red bulls-eye, globe or refractor types did not give sufficient warning because the driver was unable to tell how far away the signal was. A supplementary white light which illuminates surrouding objects gives this information. In this new beacon, a white light illuminates a small area surrounding a standard, the light itself not being visible to the motorist as the beacon is reflected downward from inside the reflector. When the beacon is mounted at a height of six feet, the illuminated area at ground level is approximately twenty feet in diameter. The motorist can thus see very distinctly the supporting standard and the objects around it.

"RED HEAD" WARNING BEACON

Mounted above the white light reflector is a ruby bowl-type refractor. The lamp in this is connected to the mercury contact flasher in the base of the standard and is intermittently flashed at intervals of about one second.

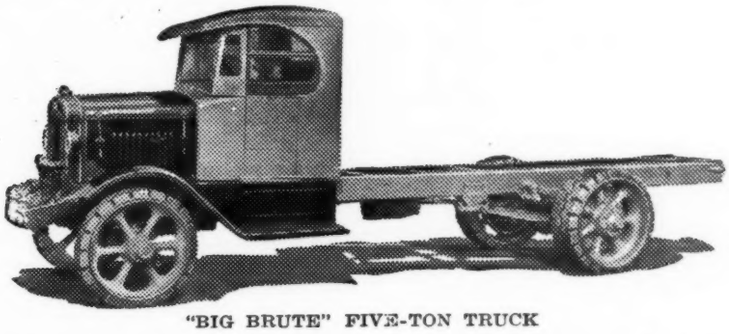
The beacon is mounted on a neat ornamental cast-iron

post which is painted with white or aluminum bronze paint. The beacon itself is painted a fire department red, thus making it serve as a day-time warning signal.

"BIG BRUTE" TRUCKS

The General Motors Truck Company, in designing the new "Big Brute" heavy-duty trucks, the name applied to its 5-ton and 2½-ton trucks, took advantage of the introduction of a new iron ore from Cuba which enabled the removable cylinder sleeves to be manufactured considerably harder and stronger without sacrificing any of the advantages of cast iron. These removable walls are used in G.M.C. trucks to permit the smoothest possible finish, to lengthen life, prevent warping and reduce servicing costs. They are surrounded by water jackets and thus held at an even temperature. They can be removed and replaced with new ones if necessary, thereby saving the cost of reboring. The Cuban ore referred to, a percentage of which is mixed with graphite iron, contains in its natural state one per cent. of nickel and two per cent. of chromium, giving to the metal an extra hardness due to the nickel and strength due to the chromium, without sacrificing the lubricating qualities of the graphite.

In addition to the above, several other new features have been introduced in the latest models by this company. Effort has been made to increase the driver's comfort and ease of operation, for which purpose an all-steel cab was designed by the Fisher Body Corporation in collaboration with the General Motors engineers, which is rattle-proof, has a one-piece full vision ventilating window shield, comfortable spring seats, and is equipped with sliding doors and sliding curtains for protection against the weather.



"BIG BRUTE" FIVE-TON TRUCK

HELTZEL BATCHER BIN

The Heltzel Steel Form & Iron Co. of Warren, Ohio, has brought out a new trailer batcher bin which can be moved completely assembled by two men without removal of the batchers and has been transported over highways for more than 60 miles and through congested city traffic at an average speed of 10 miles an hour. It is shipped completely assembled on drop-end gondola cars and is easily unloaded or reloaded without the use of a crane. It has a riveted connection that fastens on to the frame of any make of truck.

There is used with it an automatic single control batcher in which a single lever performs the complete operation of filling, cutting off, dumping the batch of sand and stone, and closing the lower gates and opening the upper gates, in less than 10 seconds.

MEASURING WHEEL BARROWS

The Sterling Wheelbarrow Co., Milwaukee, Wis., is introducing a wheelbarrow of an accurate capacity to be used in measuring sand, gravel, etc. The Sterling Barrow No. 31 holds exactly 4 cu. ft. struck capacity, and No. 61 exactly 3 cu. ft. Both embody all Sterling features, including 10-spoke wheel, self-lubricating bearings, channel steel riveted legs, and hard maple handles.

NO. 61 WHEELBARROW

WATER-LEVEL INDICATOR

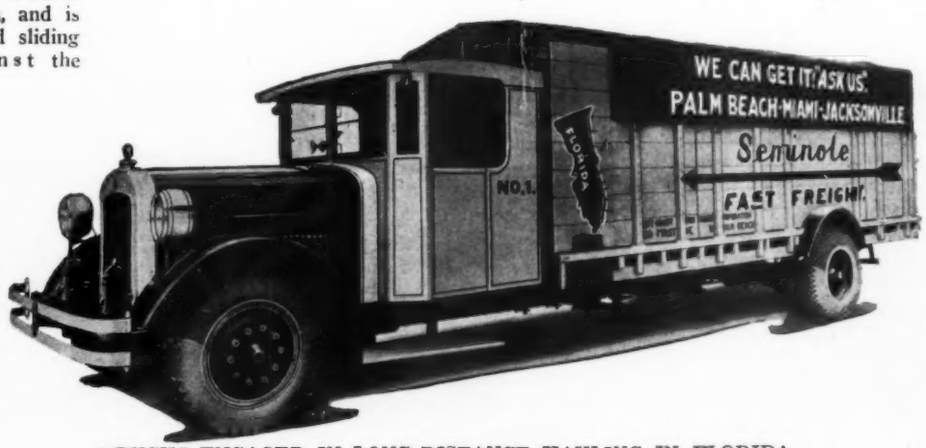
The W. B. Connor Co., Inc., New York City, has introduced a boiler water level indicator which indicates the water level in boiler drums but can be placed at eye level, in the engineer's or superintendent's office, etc. This, called the "Ace" indicator, comprises a water column of special design, containing a steel guided float which actuates the indicating device. This device consists of a series of low voltage transformers located in the steam space of the column and connected to a corresponding series of lights on a panel, which continuously burn dimly. A floating laminated armature attached to the upper float rod, passing through the transformer fields, changes the magnetic circuit and increases the secondary voltage of the neighboring transformer, thus causing its corresponding light to burn brightly. A total fluctuation of 8½ inches is provided for.

CURING AND HARDENING ROADS

The Grasselli Chemical Company of Cleveland, Ohio, manufactures a silicate of soda for curing and hardening concrete roads, in the form of a syrupy liquid which is shipped in wooden barrels, steel drums or tank cars. It calls this the Grasselli RB silicate of soda. For use it is generally diluted with three parts of silicate to one of water. The company has just issued a catalog describing this product and the method of using it

CAB FOR MOTOR TRUCKS

The Highland Body Manufacturing Co., Cincinnati, Ohio, has placed on the market a model D78 cab to be used on motor trucks where it may be necessary for the driver and helper to sleep on the trucks when engaged in long-distance hauling. This cab follows the general Highland design, with door arms high which roll into pockets beside the driver's seat and windows that are independent of the doors and slide and fold as they open and, when not needed, are locked into the rear corner. The cushions are 73 inches long and the lazy-back is

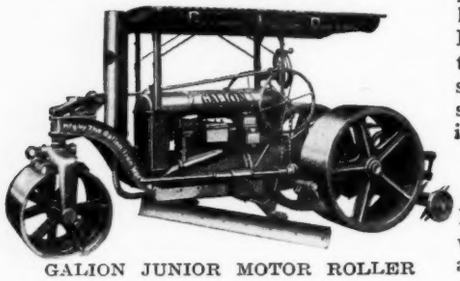


TRUCKS ENGAGED IN LONG-DISTANCE HAULING IN FLORIDA

arranged to lift up, forming an upper berth so that the two men can occupy the cab. The illustration shows one of a fleet of Ruggles trucks engaged in long-distance hauling in Florida.

GALION JUNIOR ROLLER

The Galion Iron Works & Manufacturing Co., Galion, O., makes a motor roller with three-point suspension which is claimed to increase efficiency and reduce liability of breakage and of operating troubles.



GALION JUNIOR MOTOR ROLLER

The heavy channel steel gooseneck chassis frame is solid and massive and supports the full weight of the powerplant. The blade is placed beneath the machine and is held to its work by the weight of the roller itself. The scarifier extends the full spread of the roller at the rear and will work the entire width of the roller at one trip. The special compression release springs insure constant and firm contact with the road.

The planer blade is reversible and will make either a right or a left cut as desired. With this outfit it is possible to roll a subgrade or road, or the road may be rolled and leveled at one operation.

The Galion Junior motor roller is made in 3-, 4- and 5-ton sizes. The manufacturers claim that this unit when used as a tractor has 40 to 50 per cent more power than the Fordson tractor.

BUCKEYE BACKFILLER

The Buckeye Traction Ditcher Company, of Findlay, Ohio, has recently placed on the market what it calls the Utility Backfiller. This is built on the full revolving principle which gives it a long reach in all directions. It can be used also for loading or unloading pipe from trucks and lowering it into the trench, or with a clam shell bucket.

The revolving base is a heavily ribbed steel casting in which annealed rollers operate on the machined face of the ring gear. The roller path is 4 ft. in diameter and the rotating drive is through a cup-and-cone reversing clutch controlled by a hand lever at the operator's platform. The boom is of lattice construction 29 ft. long and 10 in. x 12 in. at the center, with an added 4 ft. adjustable box channel extension giving a total length of 33 ft. There is an 8 ft. removable center section which permits shortening the boom to 21 ft.

Full length alligator traction is provided, each tread being 13 in. wide and 6 ft. 8 in. long from center to center of drive sprockets, giving a bearing area of approximately 15 square feet. Steering is through independent clutches. The road gauge is 58 in. between the wheels, or 6 ft. outside the treads. Spur gear drives only are used in reversing operations. The total width of the machine is 7 ft. 2 in., height 9 ft. 10 in. and length 10 ft. not including the boom. It weighs approximately 17,700 lbs. The road speed is 1¾ miles per hour. The motor is a 4-cylinder heavy tractor type unit rated at 38 H.P. at 1200 r.p.m. The vacuum system of fuel feed is employed. The standard equipment includes an all steel filling and dumping scraper 48 in. wide with cutters and rooters.

HADFIELD-PENFIELD GRADER

The Hadfield-Penfield Steel Co. of Bucyrus, Ohio, manufactures a grader which is readily adjusted to function as a snow plow. It has caterpillar wheels at the rear which enables it to push its way through drifts and snow banks.

On Friday, January 11th, when about 6 inches of snow had fallen at Ravenna, Ohio, plows were started at midnight and by morning the streets of the city were all cleared. During Saturday, the machines were used in clearing the snow from the principal paved streets and some of the unpaved ones.

HADFIELD-PENFIELD GRADER

"BIG RED" SNOW FENCE

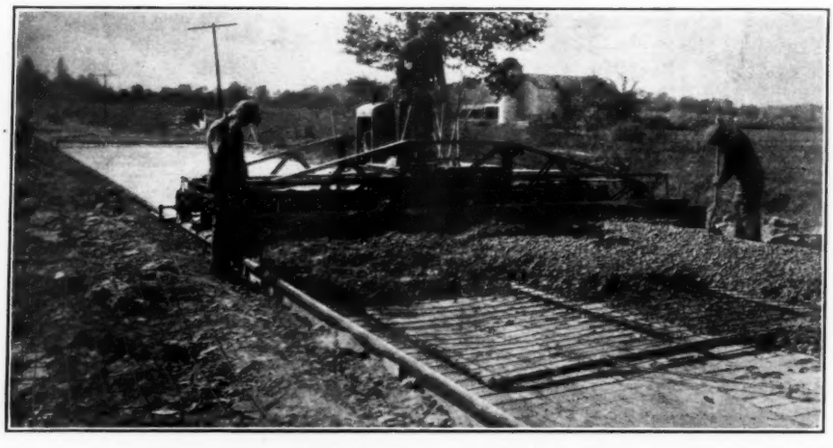
The Illinois Wire and Manufacturing Company, Joliet, Illinois, has put on the market a snow fence to which it has applied the name "Big Red." This consists of slats or pickets of wood pointed at the top, woven into five lines of wire cable. The pickets are pointed at the top to add to their appearance and also to shed water and prevent decay. The wire cables are constructed with special wire which contains copper alloy to furnish a rust-resisting quality and is galvanized and heat treated after galvanizing. The manufacturers guarantee the wire to stand the strain of twisting during the weaving of the fence without the galvanizing cracking or flaking off.

The fence is painted with red mineral preservative and put up in rolls of 100 feet, weighing 360 pounds.

LAKEWOOD FINISHING MACHINE

At the Chicago road show was shown for the first time the new 1926 model Lakewood road finishing machine. Among the improvements are a stronger truss of panel frame construction, the central panel of which carries the complete transmission assembly. This central panel is identical for all widths of machines, so that to change the width it is simply necessary to bolt on new extension side members of the proper width and put in place the other cross members such as the screed and tamper.

The machine combines a screed and tamper. The former is in front of the machine and is of steel, adjustable for crown and 12 inches wide at the bottom. It is driven at a rate of 35 to 40 strokes per minute and spreads the surface of the concrete. The tamper is hung on a spring behind the screed and has a quick, snappy, up-and-down movement. At the rear of the machine is a belt float with a driving mechanism improved over that used on previous finishers. An automotive type of sliding gear transmission with two speeds forward and two speeds reverse is employed. The transmission is enclosed in an oil-tight housing and gears run constantly in oil, insuring ample lubrication at all times. Larger traction wheels are used, 14 inches in diameter and mounted on square shafts, eliminating the necessity for keys. The drive of each wheel is direct from enclosed worms and gears mounted on the transmission frame.



LAKEWOOD ROAD FINISHING MACHINE, 1926 MODEL

NEW CATALOGS

PORTABLE ASPHALT PLANT

The Chausse Oil Burner Co., of Elkhart, Ind., in a four-page leaflet describes its portable asphalt plant, new model E-3.

NOVO HOISTING HANDBOOK

The Novo Engine Co., Lansing, Mich,. has just published a handbook dealing with applications of Novo engines, hoisters and pumps, illustrated with photographs and diagrams.

BOSS MIXERS

The American Cement Machine Co., Keokuk, Ia., publishes several bulletins describing Boss heavy-duty mixers and heavy-duty tilters; also Boss single and double-drum hoists.

WAGON LOADERS AND CONVEYORS

The Gifford-Wood Co., Hudson, N. Y., in a 96-page catalog, describes its portable conveyors, wagon loaders, bagging machines, wagon chutes, rotary screens, etc., all abundantly illustrated.

BAY CITY EXCAVATORS

The Bay City Dredge Works, Bay City, Mich., has just issued catalogs numbers 24 and 25, the former covering its model 14, and number 25 its model 16B, convertible crane excavator. It describes construction and use of these machines.

CELITE FOR CONCRETE

The Celite Products Co., Los Angeles, Calif., describes advantages of Celite, its properties, etc., in a 12-page well illustrated booklet.

ENTROPY CHART

The DeLaval Steam Turbine Co., Trenton, N. J., has published a chart on stiff Bristol board, containing the Mollier diagram, together with a scale which can be cut off and used directly for measuring heat available, spouting velocity, pounds of steam per h.p. hour, and duty between given pressure limits. Copies will be sent on request.

CENTRIFUGAL PUMPS AND TURBINES

The Moore Steam Turbine Corporation, Wellsville, N. Y. A catalog describing double-suction centrifugal pumps multi-stage steam turbines, bleeder type steam turbines, helical reduction gears, etc.

ROAD MACHINERY CATALOG

The Austin-Western Road Machinery Company, Chicago. A 96-page catalog artistically gotten up and profusely illustrated, containing revised specifications and descriptions of standard and new machinery manufactured by that company, including new road graders, street excavators, etc.

REFUSE INCINERATORS

Decarie Incinerator Corporation, New York City. A new catalog of 56 pages describing some of the more important plants which have been installed by this company and discussing briefly the subject of refuse collection and incineration, and the principles on which the Decarie system is based.

ROAD CURING AND HARDENING

The Grasselli Chemical Co., Cleveland, Ohio. An eighteen-page pamphlet describing the use and advantages of silicate of soda for curing and hardening concrete roads. Eighteen pages and several illustrations.

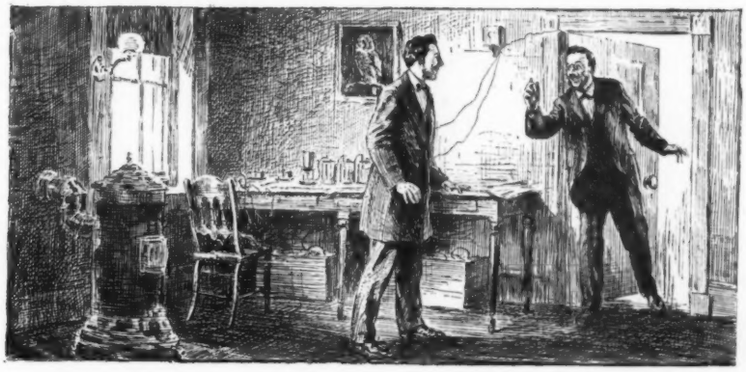
CRAWLER CRANE

The Link-Belt Co. An all-purpose crawler crane book of 48 pages, well illustrated, showing the use of drag line, dipper and trench shovel, skimmer scoop, hook blocks, etc. Also tables and information concerning the use of such apparatus.

CLETRAC CALENDAR

The Cleveland Tractor Company, Cleveland, Ohio. A calendar with a page for each month, illustrated with photographs of the cletrac in actual service.

(*Continued on page* 54)



From One Sentence To Millions

ON MARCH 10, 1876, a single sentence was heard over the telephone. Now, after half a century, 50,000,000 conversations are heard each day.

"Mr. Watson, come here; I want you," spoken by Alexander Graham Bell, the inventor, was the first sentence.

His first crude instruments had been tested by sounds and single words; the patent had been granted; the principle was established from which a world of telephones has since resulted. But at that time the telephone had not proved its practical usefulness—its power to command.

Bell's words, electrically transmitted over a wire, brought his assistant from another part of the building. And with his coming, the telephone became a dynamic factor in human affairs.

Since that first call untold millions of sentences have been heard over the telephone. Men have traveled vast distances in answer to its calls. The wheels of great industrial enterprises have turned at its commands. Everything that man can say to man has been carried to a distance over its wires and the thoughts and actions of nations have been influenced through its use.

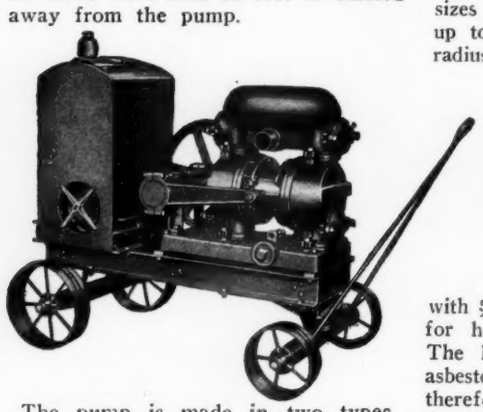
AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

HUMPHREY'S TRENCH PUMPS.

The Humphrey Manufacturing Co., Mansfield, Ohio, manufactures lift and force trench pumps which it recommends for use in building foundation, trenches, coffer dams, caisson work and similar services where the water must be lifted more than 25 feet or carried away from the pump.



The pump is made in two types, diaphragm and plunger. The former is suitable for pumping water containing large amounts of mud, sand, grit and sludge, under moderate pressures. The plunger pumps are suitable for higher pressures and are not recommended where the water contains large amounts of grit, but are suitable for irrigation, fire protection, and jetting work.

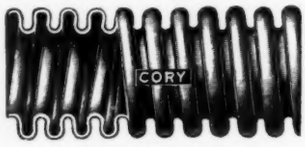
The valves are ball valves resting on machined seats. An air chamber is placed in the discharge manifold. Large, direct waterways give large capacities. There are both suction and discharge connection on each side of the pump. The entire pump is sturdily constructed and of compact design and is mounted on riveted steel frames rolling on high wheels with wide treads. Three-inch suction and discharge are used for both single and double diaphragm, and 4-inch on the large-size double plunger. The engine h.p. ranges from 1¾ for the smallest diaphragm to 6-8 for the largest plunger. The single diaphragm has a capacity of 50 gallons per minute, the double plunger 100 gallons, and the larger double plunger 220 gallons.

METRO TRUCK CABS

The Metropolitan Body Co., Bridgeport, Conn., manufactures closed and open cabs of different types for use on trucks. It suggests that the half-door duplex cab is particularly suitable for dump work and road construction. The half door is arm high and swings outward to the rear, thus giving plenty of ventilation. A snap catch holds the door firmly open without rattle, and a lock holds it firmly closed. Roller curtains which are positive in action close the openings when desired. There is a full 4-section wind shield set in rubber, with fixtures permitting either section to open independently. The cab contains protective side padding, full spring cushions and lazy-back.

FLEXIBLE METAL HOSE

Charles Cory & Son, Inc., make a seamless flexible metal hose for high steam pressures, hydraulic pressures, vacuum service and so forth. Fittings to the hose can be made by brazing or welding, thereby making the fitting an integral part of the hose. It is made in sizes up to 3½ inches in bronze and up to 16 inches in steel. For bending radius there is from 4-inch for hose



FLEXIBLE METAL HOSE

with 5/8-inch inside diameter to 44 inches for hose with 6-inch inside diameter. The hose has no joints packed with asbestos or rubber composition and can therefore be used for conveying oil, gasoline, benzol and so forth.

INDUSTRIAL NOTES

OXWELD SALES MANAGER

The Oxweld Acetylene Co., of New York City, announces the appointment of J. N. Walker as general sales manager, and of L. D. Burnett as eastern department sales manager to succeed Mr. Walker.

MICHIGAN VIBROLITHIC MANAGER

Michigan Vibrolithic, Inc., announces the appointment of O. C. Hubbard as vice president and manager. His address is 1111 Kresge Bldg., Detroit.

GALION IRON WORKS MANAGER

The Galion Iron Works & Mfg. Co., Galion, Ohio, has employed C. L. Ailes as advertising manager.

ELECTRO BLEACHING SALES MGR.

The Electro Bleaching Gas Co., of New York City, announces the promotion of William J. Weed to the position of assistant manager of sales.

LINK-BELT MILWAUKEE OFFICE

The Link-Belt Co., of Chicago, announces the opening of a branch office in the First Wisconsin National Bank Bldg., of Milwaukee, with R. C. Kendall in charge.

The company has created a new position of chief engineer, to which it has appointed W. W. Sayers, formerly chief engineer of the Philadelphia plant, whose headquarters will be at 910 S. Michigan Ave., Chicago. George L. Moorehead becomes manager of the Philadelphia plant.

GENERAL ELECTRIC COMPTROLLER

The General Electric Co., of Schenectady, N. Y., announces that on January 1st, C. H. Lang became comptroller of the budget for the company, a new position.

CLIMAX ENGINEERING CO. REPRESENTATIVES

The Climax Engineering Co., Clinton, Ia., announces the appointment of F. M. O'Laughlin as sales representative for the eastern territory with headquarters at 30 E. 42nd St., New York City.

A DIESEL ELECTRIC DREDGE

The first Diesel electric dredge to be operated on the Great Lakes, which has been given the name "The Sandmaster," is a converted ship, electrical equipment for propelling the boat and operating the pumps having been furnished by the General Electric Co. It is a hopper dredge owned and used by the Construction Materials Co. for dredging and also for transporting construction materials. The propulsion equipment consists of two 600-brake h.p. Diesel engines, each direct connected to a 400 k.w. main generator and a 50 k.w. auxiliary generator. There are also two 400 h.p. motor-driven dredging pumps, the power for which is taken from either or both of the main generators. The boat is 261 feet long, 43½ ft. beam and 18 ft. draft when loaded.

HARNISHFEGER SALES CORPORATION REMOVAL

The Harnishfeger Sales Corporation, distributor for the Harnishfeger Corporation, announces the removal of the Birmingham office from 431 First National Bank Bldg., to 401 Pioneer Bldg. J. Van Buskirk is district manager in charge.

EARLE GEAR AND MACHINE CO.

The Earle Gear and Machine Co., Philadelphia, announces the sale and transfer of all patterns, patents and good will covering Earle centrifugal pumps to the Aldrich Pump Co. of Allentown, Pa., which will manufacture and market the same in the future. The former company will continue to manufacture gears, bridge operating machinery, cold metal saws, and other machinery.

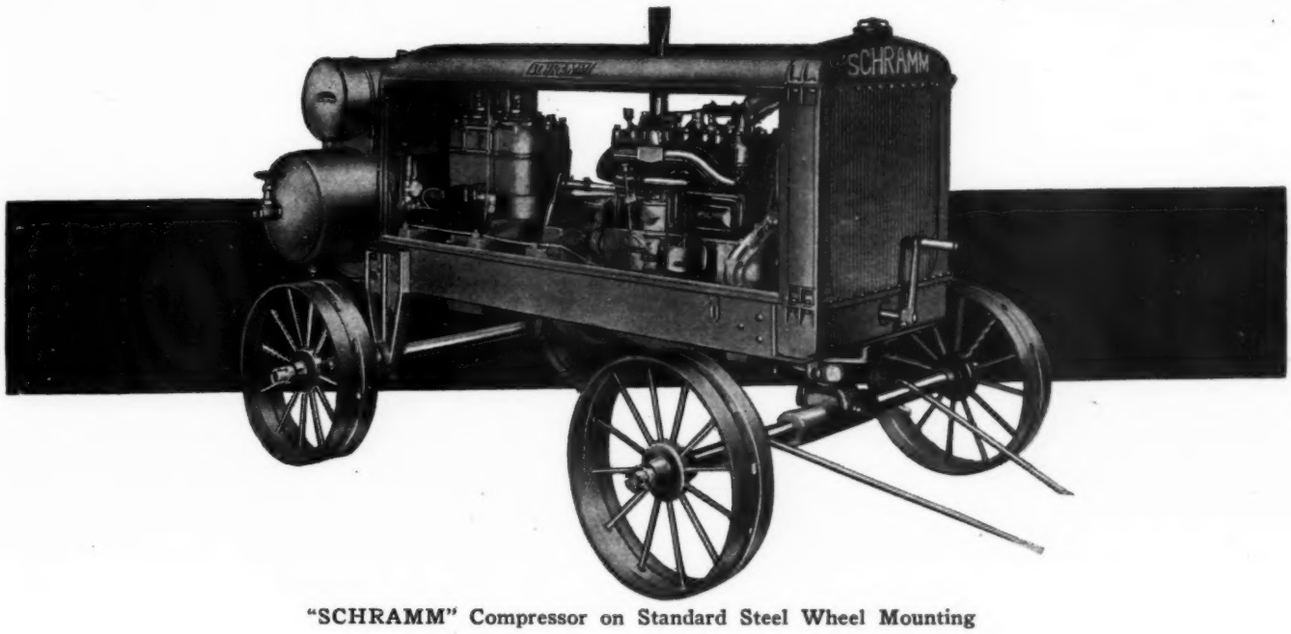
DORR COMPANY ENGINEER

The Dorr Co., New York City, announces that the sanitary engineering sales division is being managed by Frank Bachmann, with E. B. Besselievre as assistant manager.

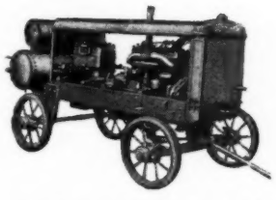
WHITE TRUCKS IN MEXICO

A fleet of 66 White trucks is beginning work on a road building program in Mexico, involving several million dollars, which is being performed by Byrne Bros. Construction Co., of Chicago. Forty of these are 3-ton dump trucks, 20 are 2½ ton trucks, 4 are 5-ton tank trucks and there are two 5-ton road oilers. More than 1,500 miles of new roads will be constructed under the Byrne contract during the next four years.

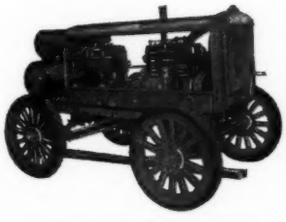
A "SCHRAMM" Compressor for every Purpose



"SCHRAMM" Compressor on Standard Steel Wheel Mounting

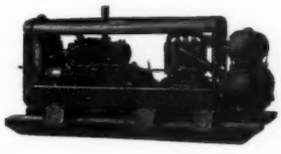


Mounted on Special Truck with Trailer Type Axle and Rubber-Tired Wheels.

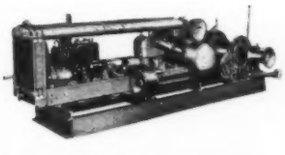


Mounted on Highway Trailer with Solid Rubber-Tired Artillery Wheels.

Mounted on Standard 1-ton Ford Truck.



Skid Mounting for Stationary and Semi-Portable Installations.



Compressor-Hoist Combination. Can be equipped with Single or Double Drum Hoist.

No matter what your work may be there is a "SCHRAMM" Compressor for every purpose. The many different type mountings enable you to select the outfit that is particularly suited for your job. Quick delivery can be made for a free demonstration from the nearest stock.

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Wichita, Kan.
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SCHRAMM

PAGE HIGHWAY GUARD

The Page Steel and Wire Co., Bridgeport, Conn., announces that 31 states have adopted the Page highway guard as standard or as an alternative for wood or cable. The company has issued a booklet of specifications based on those adopted by many of the states, accompanied by suggestions as to method of erection.

WALLACE & TIERNAN CONFERENCE

M. F. Tiernan, president of Wallace & Tiernan Co., presided at a conference of a number of members of the technical staff of the company held at Edgewater Beach Hotel in Chicago, January 6th to 10th. The various activities of the company were discussed and plans laid for future extension of them.

BAY CITY DREDGE WORKS

The Bay City Dredge Works, Bay City, Michigan, has under construction at Roselle, New Jersey, a steel warehouse and service station with a siding from the B. and O. railroad. This will be under the direction of the eastern office located at 302 Broadway, New York City.

The company also is constructing at its Bay City plant an addition with 5000 feet of floor space to be used for erection and assembly of model 16B and model 4 excavators.

The company announces the appointment of two new sales managers, Herbert Gad, with an office in Martin Building, Birmingham, for the states of Mississippi and Alabama; and Rumsey & Rumsey, of 485 51st St., Milwaukee, for the state of Wisconsin.

HARNISHFEGER SALES CORPORATION

This corporation announces the location of a branch office at Indianapolis, Indiana, 1808 Guaranty Building, with J. H. Enochs as district manager in charge.

UNIVERSAL PORTLAND CEMENT PLANT

The Universal Portland Cement Co., of Chicago, has just bought a tract of land in Cleveland, on the banks of the Cuyahoga river, on which it intends to build a modern cement plant with a capacity for one and one-half million barrels annually. Limestone will be brought by boat directly to the plant, while cement can be shipped by boat and by the Newburg and South Shore Railway, which reaches the plant.

T. L. SMITH BANQUET

The T. L. Smith Co., of Milwaukee, during the Chicago road show held a banquet for the company's distributors, who during the week prior to the show had been entertained at the company's home office in Milwaukee, many of them attending the annual meeting of the Associated Equipment Distributors.

CELITE PRODUCTS COMPANY MOVES

The Celite Products Company, Los Angeles, California, announces the removal on February 1st of its San Francisco office from the Monadnock Building to 140 Spear St., San Francisco, in order to obtain larger quarters and better operating facilities.

TEXAS COMPANY MOTION PICTURES

The Texas Company, New York City, offers to loan to any responsible organization, club or educational institution, motion pictures showing the most modern methods of constructing either sheet asphalt or asphalt macadam pavements. The former film consists of two reels and requires from 30 to 40 minutes to show; while the asphalt macadam film is in one reel which can be shown in 15 to 20 minutes. Each gives a clear and comprehensive idea of the respective types of paving work. Those desiring to borrow these films should address the Texas Company, Asphalt Sales Department, 17 Battery Place, New York City, mentioning several dates on which the use of either or both of the films is desired.

EASTERN PAVING BRICK OFFICIALS

At the annual meeting of the Eastern Paving Brick Mfrs. Assoc. in December, president R. L. Winslow, treasurer R. T. Hutchins, secretary William C. Perkins, and four vice presidents, a governor and alternate were all re-elected for the coming year.

NEW INTERNATIONAL MOTOR FACTORY

The International Motor Co., has purchased the Niles-Bement-Pond Company's plant at Plainfield, N. J., as part of its expansion program. This property has an area of more than 15 acres and includes a modern machine shop, foundry and other buildings with a total floor space of nearly 8 acres. It will be occupied by the company's general service department.

NEW STOCKLAND DISTRIBUTORS

The Stockland Road Machinery Co., Minneapolis, Minn., has appointed the Beckwith Machinery Co., of Philadelphia to represent it in eastern and southern Pennsylvania. J. W. Miller has been appointed district sales manager in Iowa. N. J. Donnelly, of the Dowling Machinery Co., Billings, Mont., will represent the company in Montana and northern Wyoming. McDonald and Burgman of Miami, Fla., are newly appointed distributors. As foreign distributors, the company has the Gippsland and Northern Co-operative Co., of Melbourne, Australia and the Havana Fruit Co., of Havana, Cuba.

U. S. CIVIL SERVICE EXAMINATIONS

(*Continued from page 47*)

Junior Geologist—Applications for this position will close on March 13th. To fill vacancies in the Geological Survey, Department of the Interior. Entrance salary is $1,860 a year which may be advanced without change in assignment up to $2,400. Duties consist in performing, under immediate supervision, elementary work in geology and related work, carrying on and assisting in geologic mapping, making and recording geologic observations, preliminary studies of mineral prospects, identifying and studying specimens of rocks, fossils and ores.

Junior Engineer—Applications will be received until April 17th. To fill vacancies in various branches of the Government service throughout the country. Entrance salary is $1,800 a year, and advancement in pay may be made without change in assignment up to $2,400 a year. Duties consist in performing routine testing, inspecting engineering material, drawing up plans for minor projects, preparing specifications for engineering material or apparatus, performing field work, making computations, preparing maps, etc., and handling technical correspondence.

NEW CATALOGS

(*Continued from page 51*)

CHLORINATING APPARATUS

Paradon Engineering Company, Long Island City, New York. Describing the Paradon chlorinator for water, sewage and swimming pools.

ELECTRIC DRAINAGE PUMP

Yeomans Brothers Co., Chicago, Ill. A leaflet describing the Yeomans automatic electric junior drainage pump, with capacities of 15 and 25 g.p.m.

NEW SULLIVAN LITERATURE

The Sullivan Machinery Company, Chicago. "Speed Up With Air," a 16-page pamphlet, mostly illustrations showing uses of portable air compressors. Also several bulletins describing concrete breakers, clay spaders, line oiler, drill steel sharpener, drill steel furnace, etc.

DROP FRAME TRAILERS

Warner Manufacturing Company, Beloit, Wis. An eight-page folder describing that company's drop frame trailers and their advantages.

STEAM TURBINE GENERATORS

General Electric Company, Schenectady, New York. Forty-four pages and inserts, showing views of Curtis steam turbine generator plants of various kinds and several turbine factories, with an attractively illustrated cover.

INDUSTRIAL TRACTORS

The International Harvester Co., Chicago, Ill. A 94-page catalog of McCormick-Deering tractors and their various accessories, trailers and semi-trailers, scrapers and other road machinery, hoists, portable saw mills, stump pullers, equipment for parks and cemeteries, etc.

REFUSE DESTRUCTORS

Hiler Engineering and Construction Co., Brooklyn, New York. The company publishes the first issue of a house organ called "Rubbish," advertising the Heenan destructor.

SLUDGE COLLECTORS

Link-Belt Co., Chicago. An illustrated folder describing the Link-Belt sludge collector and its application at several sewage plants.

NEWS OF THE SOCIETIES

March 29-April 1—NATIONAL CONFERENCE ON CITY PLANNING. Annual meeting at St. Petersburg and West Palm Beach, Fla.
April 15-17—MONTANA SECTION, AMERICAN WATER WORKS ASSOCIATION. Annual meeting at Butte, Mont.
May 17—AMERICAN HEALTH CONGRESS. Meeting at Atlantic City, N. J.
June 5-7—CONFERENCE OF STATE SANITARY ENGINEERS. Annual meeting at Washington, D. C.
June 7-11—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.
June 13-19—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Philadelphia, Pa.
June 21-25—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.
Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.
Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

AMERICAN CONCRETE INSTITUTE

The Institute held its 22nd annual convention in Chicago February 23rd to 26th. More than 600 members registered and there were seldom less than 300 at the sessions; while at one session more than 500 were present There were eight meetings for the reading and discussion of papers during the four days.

Among the papers read which are of special interest to the readers of PUBLIC WORKS, were four describing different methods of proportioning and placing concrete—one by R. B. Young describing his experience with the water-cement control method; one by W. S. Hindman describing the use of the inundator in work on the Pittsburgh stadium; a third by J. G. Ahlers describing his water-cement balancer, and the fourth by F. R. MacMillan and Stanton Walker describing the use of the water-cement ratio method in constructing the Portland Cement Association building in Chicago. A paper was read describing the concrete work on the Wilson dam, another describing experience with the application of concrete to highway and railway bridges; one on supervision of federal aid construction; and others on the effect of curing conditions on compressive strength, on the extensibility of concrete, on the relation of seven-day to twenty-eight-day compressive strength, and on soaps as integral water-proofing.

The Wason medal for the most meritorious paper presented at last year's convention was awarded to E. A. Dockstader, of Stone and Webster, for his paper "Report of Tests Made to Determine the Temperatures in Reinforced Concrete Chimney Shells."

The officers elected were, president, Maxwell M. Upson and secretary, Harvey Whipple.

CONNECTICUT SOCIETY OF CIVIL ENGINEERS

This society held its 42nd annual meeting at New Haven, February 16th and 17th, in lecture rooms of Yale University. About 175 members and guests were in attendance. The officers elected for 1926 were as follows: President, Joseph P. Wadhams; vice presidents, Vincent B. Clarke and George E. Hamlin; additional members of the board of directors, Carlton T. Bishop and Harold L. Blakeslee; secretary, Clarence M. Blair and assistant secretary F. J. Trowbridge were reelected.

Among the papers read on Tuesday were the following: "The Widening of the Boston Post Road" by Arthur W. Bushell; "Delaware River Bridge" by Clement E. Chase; "Stream Pollution and Industrial Wastes" by James A. Newlands, who made a plea for cooperation between state commissions and industries which pollute streams. At the annual dinner Tuesday evening, Dr. Hollis Godfrey gave a talk on the earthquake hazard along the northern Atlantic seaboard. On Wednesday, Laurence J. Carmalt read a paper on "Traffic and City Planning; and one by Dexter P. Cooper on "Some Aspects of the Proposed Tidal Power Development at Eastport, Maine," was read in his absence.

ASSOCIATION OF HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES

The second annual convention of this association was held at Syracuse, New York, on February 17th to 19th with over 1,000 in attendance. About forty manufacturers exhibited road material and equipment. Among the subjects receiving special discussion at this session were railway grade crossing elimination and safety upon the highways.

AMERICAN PUBLIC HEALTH ASSOCIATION

A special meeting of this association will be held at Atlantic City, N. J., on May 17th to 22nd in connection with the American Health Congress. The regular annual meeting of the association will be held at Buffalo, New York, October 11th to 14th. At the former meeting there will be discussed the subjects of training of sanitarians, water pollution by industrial wastes, health administration and duties of a health officer.

DETROIT ENGINEERING SOCIETY

This society is offering to engineers and other concrete men, a two weeks' course in concrete mixing, aimed to result in improving the quality of concrete; also giving practical exercise in designing and proportioning concrete mixtures, standard methods of taking samples and testing, and so forth.

ENGINEERING SOCIETY OF WISCONSIN

This society met at Madison on February 18th to 20th when it elected as president, C. M. Baker, and as vice president G. E. Heebink. The society adopted a resolution providing for the joint publication of its proceedings with those of the Iowa and Illinois societies, which had already adopted a similar resolution. Quarterly publication will secure second class mailing privileges and other economies. The Illinois proceedings will be published in April, those for Wisconsin in July and for Iowa in October, while the January number will be a joint issue.

One of the matters discussed by C. M. Baker, state sanitary engineer, and others, was co-operation between the state board of health and industries which pollute streams. Other papers dealt with sewerage and sewage disposal, water supply, garbage collection, street transportation and other municipal problems. Joseph P. Schwada, city engineer of Milwaukee, stated that both costs and number of complaints in connection with garbage collection had been reduced by the adoption of the truck and trailer system.

ILLINOIS SECTION, AMERICAN SOCIETY CIVIL ENGINEERS

This section has elected, as president, L. R. Harza in place of J. N. Hatch, who had previously been elected but declined to serve.

UTAH SECTION, AMERICAN SOCIETY CIVIL ENGINEERS

At its annual meeting on Feburary 4th, this society elected H. S. Kerr as president and Murray Sullivan as vice president. H. S. Kleinschmidt was reelected as secretary-treasurer.

WYOMING ENGINEERING SOCIETY

This society at its meeting on January 22nd and 23rd elected Elmer K. Nelson as president, W. C. Newell, vice-president, and J. Q. Naret as secretary-treasurer. Resolutions were passed urging the appointment of a state sanitary engineer and the completion of the topographic maps of Wyoming by the U. S. Geological Survey.

ROCKY MOUNTAIN SECTION, AMERICAN WATERWORKS ASSOCIATION

About seventy-five waterworks superintendents located in Colorado, Wyoming and New Mexico, have organized a Rocky Mountain section of the American Waterworks Association and elected as officers: P. E. Strouse, chairman; A. W. Stedman, vice chairman, and Dana E. Kepner, secretary-treasurer. Several papers were read at the organization meeting, among them "Bacteriology of the Animas River"; "Microscopic Organisms Causing Tastes and Odors in Water"; "Watershed Sanitation"; "The Rocky Ford Filters"; "Design and Maintenance of Distribution Systems"; and "Iodine and Goitre."

INDIANA ENGINEERING SOCIETY

This society held its 46th annual meeting February 25th and 26th at Indianapolis, with an attendance of about 100. The membership has considerably increased during the past year and is now 440. The officers elected were, president, E. L. Carter and vice president, Roy Thurman. Charles Brossman was reelected secretary. One session was devoted to electrical engineering, a second to architcture and civil engineering, a third to chemical engineering and a fourth

to mechanical engineering. Several technical papers were read and discussed.

MASSACHUSETTS HIGHWAY ASSOCIATION

This association held its annual meeting February 11th, and elected the following officers: President, Fred B. Richardson; vice presidents, John A. Gaffey and Peter G. Holmes, and treasurer, Charles A. Brown.

NEW ENGLAND WATERWORKS ASSOCIATION

The 45th annual convention of this association will be held at Providence, R. I., September 14th to 17th.

ENGINEERING COUNCIL

The American Engineering Council held its annual meeting in Washington, D. C., January 14th to 15th, when it elected the following officers: President, Dean Dexter S. Kimball; Vice-presidents, Gardner S. Williams and Irving E. Moultrop; Treasurer, Harrison E. Howe, and Executive Secretary, L. W. Wallace. The Council approved of the public works bill drawn up by a public works conference held in Washington immediately preceding the meeting.

ENGINEERING INSTITUTE OF CANADA

This institution held its fortieth annual convention at Montreal on January 26th and at Toronto on January 27th to 29th. Four hundred and fourteen members were registered and a large number of visitors attended, including students from the University of Toronto. Among the papers read were the following: "Deterioration of Concrete in Alkali Soils," by Professors C. J. Mackenzie and T. Thorvaldson. "Design of East York Sewers and their Construction by Contract and Day Labor," by R. O. Wynne-Roberts and Grant R. Jack. "The Water Supply of the Border Cities," by William Gore and J. B. Clark Keith. "Reduction of Flexural Stresses in Fixed Concrete Arches," by J. F. Brett.

The following officers were elected for the coming year: President, G. A. Walkem; Vice-Presidents, A. S. Dawson, Peter Gillespie, K. B. Thornton, W. G. Mitchell and G. D. MacDougal.

U. S. CIVIL SERVICE EXAMINATIONS

Applications will be received until April 27th for positions of associate construction engineers for duty in the field. Entrance salary is $3,000 per annum. Duties comprise taking charge of erection of federal buildings constructed by private contractors.

Junior Chemist. Applications for this position will close on May 1st. To fill vacancies in the federal classified service throughout the country. Entrance salary is $1,860 per annum with advancement in pay up to a maximum of $2,400 without change in duties. Duties include investigations and research connected with the technology of wood products, including wood preservation and hydrolysis.

Assistant Mechanical Draftsman, Mechanical Draftsman and Senior Mechanical Draftsman. Receipt of applications for the above positions will close April 13th. To fill vacancies in the Coast Guard, Treasury Department, etc. Entrance salaries are $1,500, $1,680 and $1,860 respectively with possible advancement in pay without change in assignments up to $1,860, $2,040 and $2,400 respectively. Duties of the first are to make or revise tracings of construction drawings of minor difficulty, to do miscellaneous mechanical drafting and to make minor routine technical calculations or computations; of the second to make simple layout or general drawings, prepare drawings for various types of mechanical works, make routine technical computations and calculations, prepare and maintain data, charts, diagrams, etc.; and of the last to do simple designing, make minor layout or general drawings, make routine technical calculations or computations, supervise the work of a small number of employees engaged in detail drawings, general drafting or related work.

Assistant Scientific Aid and Junior Scientific Aid. Applications will be received until May 1st, to fill vacancies in the Departmental service. Entrance salaries are $1,500 and $1,320 respectively with probable advancement in pay up to $1,860 a year for the former and $1,680 for the latter, without change in assignment.

Junior Metallurgist. Receipt of applications for this position will close April 17th. To fill vacancies in the federal classified service. Entrance salary is $1,680 per annum with advancement in pay without change in assignment up to $2,400. Duties consist of general metallurgical work connected with the fabrication of manufactured articles, general metallurgical work including process control, physical testing of metallurgical materials or ores, microphotography and research work on metallurgical problems.

Junior Topographic Engineer. Applications for this position will close April 16th. To fill vacancies in the Geological Survey at an entrance salary of $1,860 per year, which may be advanced to $2,400 without change in assignment. Duties include problems involving quadratics,, plane and solid geometry, plane trigonometry, logarithms, mensuration, surveying, etc.

Junior Hydraulic Engineer. April 17th is the closing date for applications. To fill vacancies in various branches of government service at an entrance salary of $1,860 a year which may be advanced without change in assignment up to $2,400 per year. Duties are to perform such work as routine testing, drawing up plans for minor projects, performing field work, making computations, compiling reports, etc.

Associate Mechanical Engineer, Assistant Drainage Engineer and Assistant Irrigation Engineer. Applications for these positions will be received until April 27th. To fill vacancies in Bureau of Public Roads at entrance salaries of $3,000, $2,400 and $2,400 respectively which may be advanced without change in assignment up to $3,600 a year for the first and $3,000 for the others. Duties of first consist in the development of cotton-drying machinery and design of farm implements and machinery; of the others to make surveys and prepare plans and reports upon projects involving drainage and irrigation of agricultural lands, to collect technical data and conduct original investigations in the field of agricultural drainage and irrigation.

Calculation Engineer, Associate Valuation Engineer. Applications for these positions will be received until April 20th. To fill vacancies in the technical staff of the Income Tax unit of Bureau of Internal Revenue, at salaries of $3,800 and $3,000 respectively, with advancement in pay up to $5,000 and $3,600 per year. Duties involve the estimation of quantity of natural resource in place, theoretical and market values of natural resource in place, cost of development, exploitation, etc.

NEW CATALOGS

BETTER CONCRETE ROADS

The National Lime Association, Washington, D. C. A. 20-page pamphlet, illustrated, citing numerous concrete roads to support its claim for the advantages of the use of hydrated lime in concrete.

KWIK-MIX CONCRETE MIXER

The Kwik-Mix Co., Port Washington, Wis. A 42-page catalog of 2 S to 7 S mixers; also plaster mixers and diaphragm pumping units.

SAND AND DREDGING PUMPS

The Morris Machine Works, Baldwinsville, N. Y. Bulletin No. 20; 44 pages, illustrated. Discusses hydraulic dredging and describes in detail Morris dredging pumps, power equipment, cutters, spuds, etc.

OIL JACKS

The Oil Jack Company, Inc., New York City. Folder describing and illustrating the Pedersen Oiljak, 10 tons capacity and 11 inches high.

THE BABY DIGGER

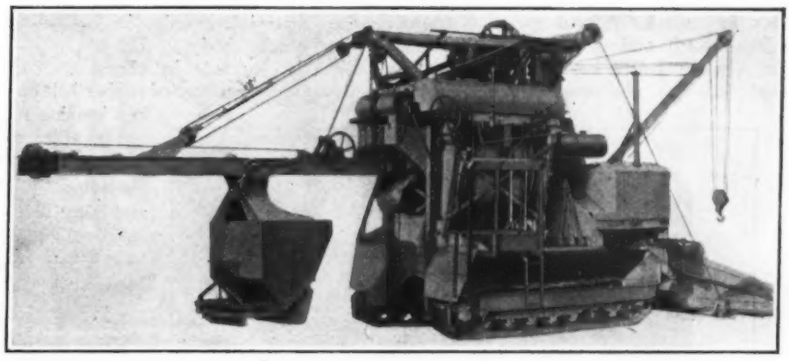
The Cleveland Trencher Co., Cleveland O. A 16-page pamphlet describing a wheel-type trench digger for trenches up to 5½ feet deep and 23 inches wide.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

REX WATER SYSTEM

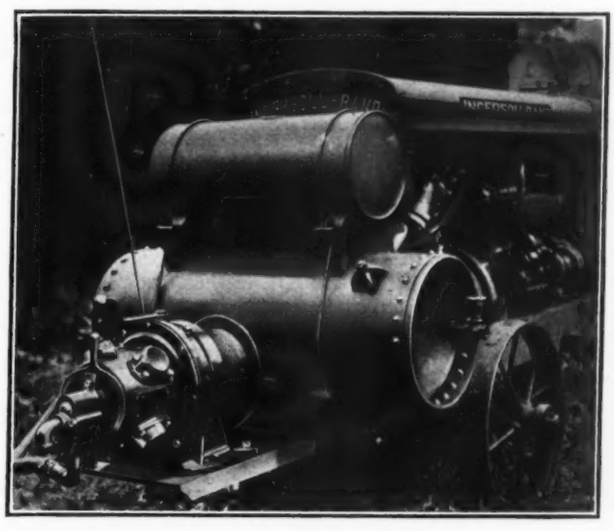
The Chain Belt Co., Milwaukee, Wis., announces that its engineers have recently perfected a new water system for the Rex 21E paver. The manufacturers claim that the tank discharges completely in from six to seven seconds, which is only one-half to one-third of the time required by old-style tanks. This not only reduces the time of waiting for charging the mixer, but it gives a full minute for refilling the tank before a mixing cycle of 70 seconds is completed—an advantage where the pressure in the water line is low. In addition, the dribble of water which often continues for several seconds at the end of the discharge is eliminated, the siphon which discharges the water being so constructed that it does not suck air until the tank is virtually empty. In addition, the pipe from water tank to drum is constructed without elbows or inside obstructions.



REX PAVER EQUIPPED WITH NEW WATER SYSTEM

INGERSOLL-RAND AIR HOIST

The Ingersoll-Rand Company, New York City, has brought out a new size D.U. utility air motor hoist designed especially for use with portable compressors, but also being of general utility. It is recommended to road builders for hauling or lifting rocks and trees from the right-of-way, laying culverts, hauling a scraper or in pulling and hoisting jobs. Also for trench work for hauling pipe lengths into position and dragging in back fill. It may be used for hauling wire or cable through conduits, or stringing telephone wire, or may be used for hauling the compressor itself a short distance. It is a light, compact hoist of the winch type, provided with mountings by which it may be attached to the rear end of a 5½ x 5 or 5 x 5 portable compressor, to the side of larger compressors or to compressors mounted on Ford trucks. It is capable of exerting a rope pull of 1,000 pounds and taking 350 feet of 5-16 in. cable. It is equipped with a clutch so that the cable can be played out easily by hand or by a down grade load without turning over the motor and consuming air; a hand brake on the drum serving to check the unwinding and stop it in any desired position. The rope can be moved at any speed up to 65 feet per minute. While lifting a 1,000 pound length of pipe into a trench, the hoist can be operated by a 5½ x 5 portable compressor. A winch head can be furnished in place of the rope drum.



SIZE DU UTILITY HOIST MOUNTED ON REAR END OF 5½x5" PORTABLE COMPRESSOR

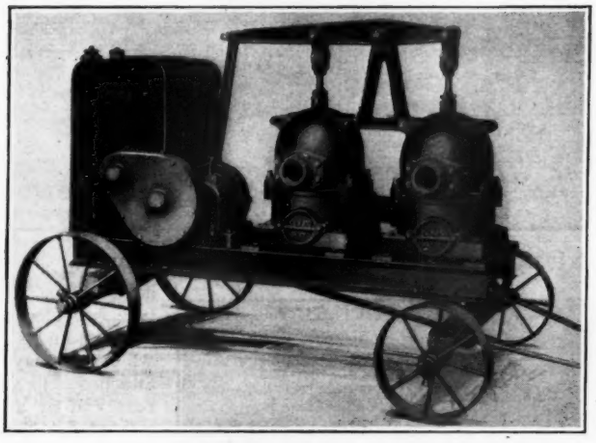
GALION ONE-MAN GRADER MAINTAINING ROAD ON MOUNT WILSON

GALION FORDSON ONE-MAN GRADER

The Galion Iron Works and Manufacturing Company, Galion, Ohio, manufactures a Fordson one-man grader equipped with crawlers, which, while sturdy and powerful enough to move considerable masses of material and smooth a road into shape, has as its main function the continuous patroling of the road, smoothing it, filling ruts and keeping it in good condition. Thirty-six-inch lift wheels with cut steel worm gears running in oil in an enclosed gear case make it comparatively easy to lift the blade. The operator is comfortably and safely seated with every control within easy reach and with full view of the blade work and the road ahead.

NOVO DIAPHRAGM PUMPS

The Novo Engine Company, Lansing, Mich., has placed on the market a new diaphragm pumping outfit which carries a U.P. two-cylinder engine which develops 3 to 6 horsepower. It is a two-cylinder, four-cycle, L head, hopper or radiator cooled gasoline engine. Crank shaft and power drive shaft run in Timken roller bearings. Connecting rod bearings are pressure cast babbitt, reamed and burnished. The cam shaft runs in brass bushings. The self-oiling, speed-reducing unit used on the diaphragm pumps operated by this engine completely encloses and protects all gearing. The pumps are surplus powered and smooth running, minimizing the strain upon the engine and pump and lengthening the life of the outfit. Both single and double pumps are built. The two-cylinder is regularly furnished with a steel house.



NOVO DOUBLE 4" CLOSED TOP FORCE DIAPHRAGM PUMP, POWERED WITH NOVO UF 3-6 H.P. 2-CYLINDER ENGINE

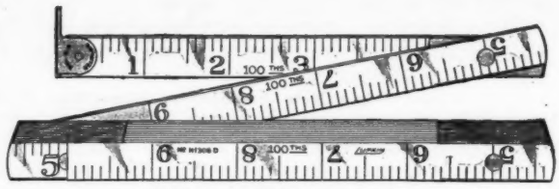
WESTERN STREET EXCAVATOR

The Western Wheeled Scraper Company, Aurora, Illinois, has introduced a new street excavator which is an end-loading elevating grader that loads material forward into a motor truck which pulls the machine. The excavator is narrower than the truck that pulls it and the entire assembly can operate in a street that is 14 feet from curb to curb. The excavator is steered independently of the truck and thus can be swung around a manhole or other obstruction.

The excavator is composed primarily of a heavily built-up steel structural framework mounted on rubber-tired wheels with Timken roller bearings, with a heavy plow on the left side and a short transverse elevator underneath the frame. The plow turns the excavated material on to the elevator, which in turn deposits it into hopper, from which it is fed onto a longitudinal trough-shape elevator extending upward and forward from the hopper to a point beyond the front end of the machine. The elevators are operated by a gasoline motor. At the upper end of the elevator is a specially designed spout or deflector controlled by an operator on the platform of the excavator who can thus distribute the material evenly in the truck body. The dirt is carried in the elevator by a troughed rubber belt on Timken bearing rollers.

The axles of the excavator are of the automobile type and the wheels carry standard 34 in. by 5 in. rubber tires. All bearings used on the machine are of either roller or ball anti-friction type. There is a specially designed automatic coupling for attaching the excavator to the truck which may be instantly released by the operator of the machine by means of a lever conveniently placed, thus releasing the truck as soon as it is loaded. Another truck then backs up to the machine and is coupled to it and the outfit moves forward as before. The manufacturer states that from four to six yards can be loaded into a truck in from two to three minutes and that it is conservative to state that the machine will load from 15 to 20 trucks or from 60 to 100 cubic yards per hour, according to working conditions and the experience with which the outfit is handled.

The machine is 7 feet 2½ inches wide over all, and 28 feet 1½ inches long, with a wheel base of 13 feet 10 inches. The gasoline motor is rated at 24 horsepower. The machine weighs about 8,600 pounds.



LUFKIN ALUMINUM RULE

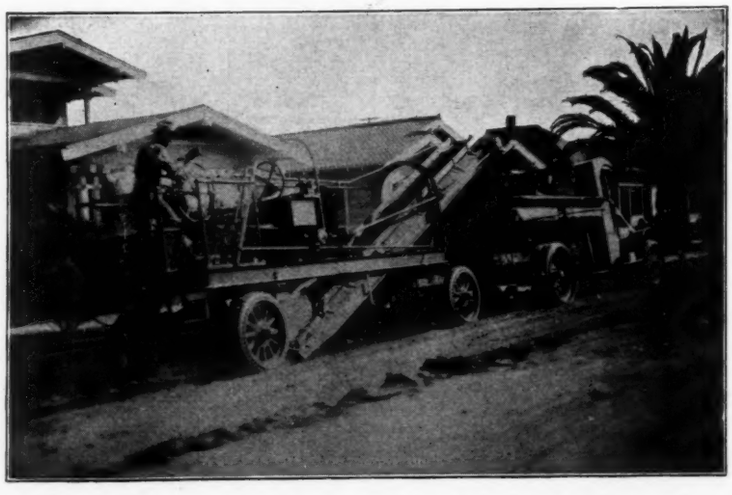
ALUMINUM RULE IN 100THS OF FEET

A folding aluminum rule graduated in 10ths and 100ths of feet is now offered by The Lufkin Rule Co., Saginaw, Michigan, supplementing its established line of aluminum rules in inch marking.

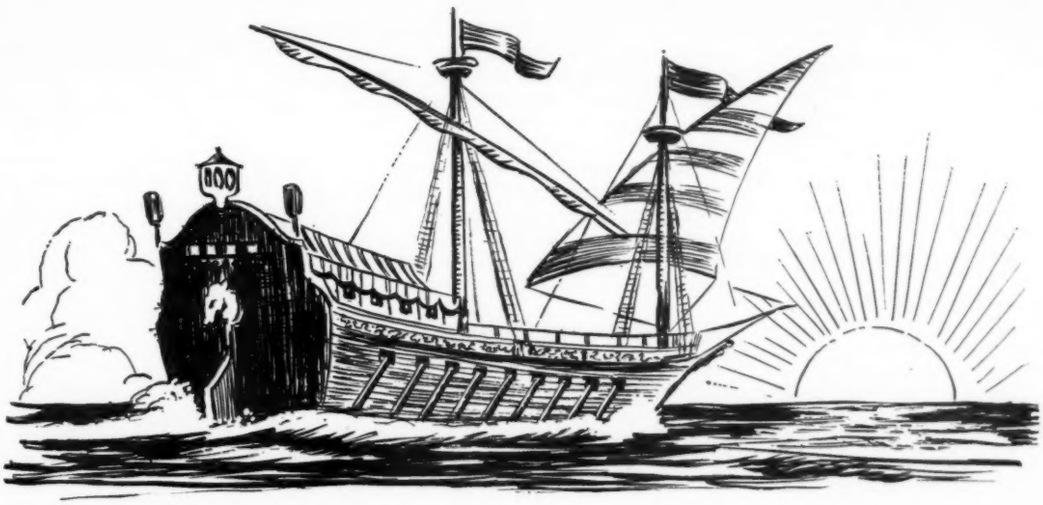
The 10ths rule is designed to meet the needs of civil engineers, surveyors, highway builders and tile-layers, and will appeal to others in related lines of work. As its opposite side bears the common graduation, feet, inches and 16ths, the rule is suitable for all ordinary measuring. Graduations begin at same end on both sides, so a 10ths measurement can readily be converted into terms of inches, and vice-versa.

This new rule is made in 6-foot length with 6-inch sections. It can be supplied either with or without folding end hook. This hook is suitable for taking measurements out of arm's reach and handy in all measuring. It readily folds up and remains flush with edge of rule. Zero point falls at inside of hook when open, and at extreme end of rule when hook is closed, a feature that has proven popular on Lufkin wood rules.

These aluminum rules are of a special hardness, therefore hold their shape well. The dark, sunken graduations show up distinctly. While very durable, the aluminum rule is lightweight. It is accurate, and, having solid brass joints, is rust proof throughout.



WESTERN WHEELED SCRAPER COMPANY'S NEW STREET EXCAVATOR



Thru Vitrified Many Civilizations Clay Products have Survived— Modern Cities Now Use It

THRU the many civilizations, Babylon, Carthage, Greece, Rome, the middle ages on thru modern times, clay pipe has survived. Today we still find in excavations Vitrified Clay Products made 6,000 years Before The Christian Era.

They were built for drainage purposes then, and they have survived time and usage. Because Vitrified Clay Pipe resists all corrosion it is today recognized as the one material providing all the qualities necessary to satisfy the exacting demands of sanitary structures.

Interesting literature about clay products has been prepared. We will gladly send it.

36-inch Single Strength Salt Glazed Vitrified Clay Pipe laid in Wissahickon Low Level Intercepting Sewer, Fairmount Park, Philadelphia, March, 1925.

For permanence: —

EASTERN CLAY PRODUCTS ASSOCIATION

Colonial Trust Bldg., Philadelphia, Penna.

American Vitrified Products Co., Akron, Ohio
The Buckeye Fire Clay Co., Uhrichsville, Ohio
The Cambria Clay Products Co., Blackfork, Ohio
Clay City Pipe Company, Uhrichsville, Ohio
The Crouse Clay Products Co., Akron, Ohio
The Dennison Sewer Pipe Co., Dennison, Ohio
The East Ohio Sewer Pipe Co., Irondale, Ohio
The Evans Pipe Co., Uhrichsville, Ohio
The Junction City Sewer Pipe Co. Junction City, Ohio
Kaul Clay Manufacturing Co., Toronto, Ohio
The Logan Clay Product Co., Logan, Ohio
The Patton Clay Mfg. Co., Patton, Pa.
Penna. Clay Products Co., West Winfield, Pa.
Peerless Clay Manufacturing Co., Port Homer, Ohio
Portland Stone Ware Co., 49 Federal St., Boston, Mass.
The Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
The Robinson Clay Product Co., Akron, Ohio
The Robinson Clay Product Co. of Pennsylvania Clearfield, Pa.
The Romig Clay Product Co., Uhrichsville, Ohio
The Ross Clay Products Co., Uhrichsville, Ohio
St. Marys Sewer Pipe Co. St. Marys, Pa.
Stillwater Clay Products Co., Uhrichsville, Ohio
Union Clay Manufacturing Co., Empire, Ohio
The Wolf-Lanning Clay Co., Dennison, Ohio

It must be Vitrified Clay Pipe

INDUSTRIAL NOTES

SULLIVAN MACHINERY DISTRIBUTOR

The Sullivan Machinery Co., Chicago, Ill., announces the appointment of Borchert-Ingersoll, Inc., 2360 University Avenue, St. Paul, as its local distributor in the Twin Cities, which will carry in stock portable and stationary air compressors, rotator hammer drills, concrete breakers, clay spaders, and "Turbinair" and electric portable hoists of Sullivan manufacture.

The Sullivan Machinery Co. was represented at the Southwest Road Show at Wichita, Kansas, March 2 to 5, by a complete exhibit including two portable air compressors, heavy duty and light service concrete breakers, clay spaders, drills and hoists. The exhibit was in charge of James W. O'Brien of the St. Louis office, with several other representatives present.

HARNISCHFEGER AGENTS

The Harnischfeger Corporation, Milwaukee, Wis., announces the appointment of William H. Hale Company as its agents in the state of Minnesota with headquarters at 607 Fifth Avenue, Minneapolis, Minn. Also the Clark-Wilcox Co. of 17 Lafayette Street, New Haven, Conn., and 786 Albany Street, Boston, Mass., in place of the K. B. Noble Company of Hartford, Conn.

HELTZEL WISCONSIN REPRESENTATIVE

The Heltzel Steel Form & Iron Co., Warren, Ohio, has appointed Chadwick Bros. Co., corner 25th and Clybourn Streets, Milwaukee, Wisconsin, as its representative on steel sidewalk forms, curb forms, curb and gutter forms, etc., in the State of Wisconsin.

HONOR TO P. A. KOEHRING

P. A. Koehring, general manager and secretary-treasurer of the Koehring Company, was recently unanimously elected president of the Milwaukee Association of Commerce.

NEW PLANT FOR MAKING ACIPCO PIPE

A new plant is being erected by the American Cast Iron Pipe Co. for manufacturing centrifugal cast-iron pipe in refractory molds in 16-foot lengths and diameters of 4, 6, 8, 10 and 12 inches, with a capacity equivalent to two 6 in. pipe per minute. "Acipco Mono-cast Pipe" is the trade name adopted for this pipe. It will be made in seven standard weights—Classes A, B, C and D of the American Water Works Association, standard weights of the American Gas Association, and two lighter weights, 17½% and 25% respectively lighter than the A. W. W. A. Class B.

Specifications for this pipe are now ready for circulation. It is expected that the plant will be ready for operation on a commercial basis by the middle of May, and that the product itself will be ready for distribution in commercial quantities by the latter part of that month.

MONARCH TRACTORS MOVES TO SPRINGFIELD, ILL.

Monarch Tractors, Inc., Watertown, Wis., announces that the business will be removed to Springfield, Ill., and that an Illinois corporation has been organized with a capital stock of $600,000 to take over all of the tractor business of the company except the Watertown lands and buildings. The new company, the name of which is Monarch Tractors Corporation, has purchased a factory site in Springfield and erected a brick and steel building with 80,000 sq. ft. of manufacturing space on one floor.

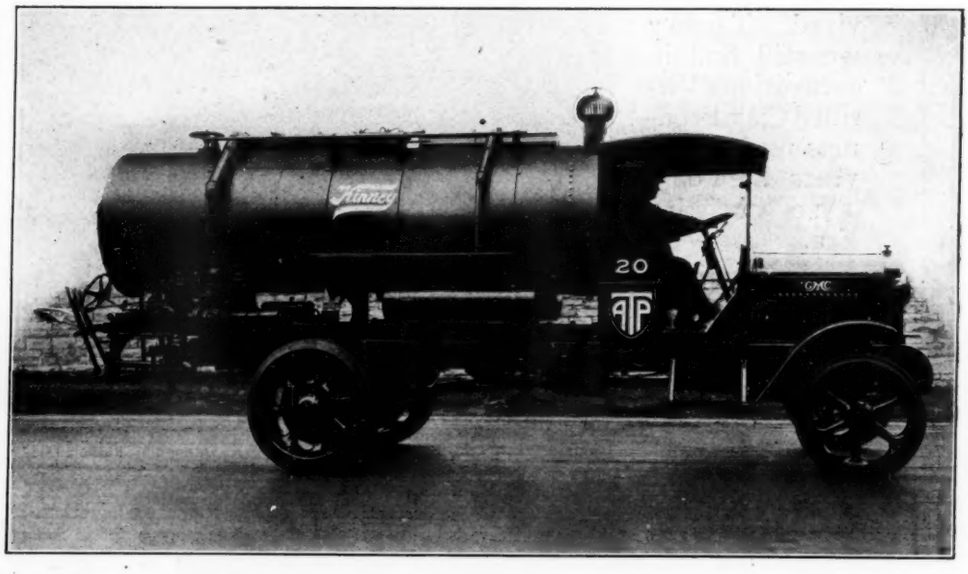
The officers of the new firm are: R. W. Gotshall, president; H. B. Baker, R. C. Lamphier, vice-presidents; and Owsley Brown, secretary and treasurer.

T. L. SMITH DISTRIBUTORS

The T. L. Smith Co., Milwaukee, Wis., announces the appointment, as distributors of their concrete mixers, of the T. E. Schilling Company of Miami, Florida; the O. B. Avery Company of St. Louis, Mo., in eastern Missouri and southern Illinois; the Coast Machinery Corporation of San Francisco in the Frisco territory; the LaLance Equipment Company of Huntington, W. Va., for southern West Virginia; and the J. Z. Horter Company of Havana, Cuba, for the Island of Cuba.

TRADE MARK
Kinney
REG. U.S. PAT. OFF.

Time Labor and Money Saver



The Kinney Heater and Distributor

Meets all specification requirements. Guaranteed to sufficiently heat and properly apply all varieties and grades of bituminous material for road construction and maintenance.

Kinney Manufacturing Company

BOSTON, MASS.

New York *Philadelphia* *Philippine Islands* *Chicago* *Porto Rico* *Houston* *Cuba* *Kansas City* *Hawaiian Islands* *San Francisco*

NEWS OF THE SOCIETIES

April 30—NATIONAL HIGHWAY TRAFFIC ASSOCIATION. Annual meeting at New York City.

May 17—AMERICAN HEALTH CONGRESS. Meeting at Atlantic City, N. J.

June 5-7—CONFERENCE OF STATE SANITARY ENGINEERS. Annual meeting at Buffalo N. Y.

June 7-11—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.

June 13-19—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Philadelphia, Pa.

June 21-25—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

July 14-16—AMERICAN SOCIETY OF CIVIL ENGINEERS. Summer meeting at Seattle, Wash.

Aug. 23-25—NORTH CAROLINA SECTION, AMERICAN WATER WORKS ASSOCIATION. Sixth annual meeting at Asheville, N. C.

Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.

Oct. 4-9—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

SECOND HIGHWAY SAFETY CONFERENCE

In 1924 a conference was held on highway safety, and last spring committees were appointed to prepare reports for a second conference, which was held on March 23rd to 25th of this year, being called at Washington by Secretary Hoover. Approximately 1200 men and women from all parts of the country attended.

These conferences have dealt largely with causes and remedies not directly connected with engineering, the expressed purpose being to focus public attention on the increasing number of street and highway accidents, and to develop a comprehensive program for reducing the number of these accidents. The greater part of the time this year was given to an effort to adopt a model motor vehicle law with a view to urging its adoption by the several states and municipalities.

The Committee on Statistics reported that in 1924 there were 23,300 deaths and nearly 600,000 serious injuries which were incurred in street and highway accidents, at least 85 percent of which were due to automobiles. Complete statistics for 1925 were not available, but those obtained indicated a slight increase over 1924; but it also appeared that the rate of increase was less than between 1923 and 1924. Railway grade-crossing accidents appeared to have increased more than other classes. Automobile accidents in the larger cities appeared to be slightly decreasing.

The Committee on Metropolitan Traffic Facilities reported that it estimated the losses of life, personal injuries and annual destruction of property in traffic accidents at six hundred million dollars annually; while additional loss resulting from congestion and extra distances traveled as a result of inadequate traffic facilities, from increased maintenance and operating costs of vehicles due to improper road surface, from excessive grades, from time lost at the grade crossings, and other causes were estimated to bring the annual loss up to more than two billion dollars or $20 per capita on the entire population of the United States.

"These great annual losses constitute one of the most conspicuous and widespread economic wastes, reaching every individual not only through the continual menace to life and safety, but also through the increased costs of nearly every necessity of life. For the correction of this waste large expenditures are amply justified."

The conference recommended that an executive committee be created for each of the various subjects, to serve as a clearing house for securing cooperation among organizations and other groups which are concerned with the various phases of highway safety; and that whenever in the future it would seem desirable to do so, a third conference be called for further consideration of the problem.

ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION

The eighteenth annual meeting of the Illinois Section of the American Water Works Association was held at the University of Illinois on March 24 and 25, 1926. This was one of the most successful meetings in recent years and the attendance of members of the Illinois Section was greater than many years past. (An approximate check shows about same for 1916 and 1917). The attendance included thirty-nine active members, representatives of three corporate members, and representatives of seven associate members of this section. The attendance of members from outside of the state was comparatively small. It included two active members and representatives of six associate members of the society. Several were prevented from attending by illness, previous engagements, and attendance at the Indiana section meeting.

Every paper listed on the program was presented and they were freely discussed. The talk by Beekman C. Little, secretary of the Association, on affairs of the association was very interesting and instructive.

The weather was exceptional and many availed themselves of the opportunity to see the experimental and demonstration apparatus which had been explained at the meeting by Professors M. L. Enger and H. E. Babbitt; to accept the courtesy of Mr. Amsbary and visit the plant of the Champaign and Urbana Water Company; and to accept the courtesy of G. H. Radebaugh, manager of the Urbana-Champaign Sanitary District, and visit the sewage disposal plant of the district.

The following resolution was adopted:

> Whereas the Illinois section of the American Water Works Association has suffered a loss in the death of G. A. Wadsworth, Superintendent of Water Works at Evanston, a valued member of this organization, who was killed by accident on October 1, 1925, while actively engaged in performing his official duties: Therefore, be it resolved, that this society express its deep regret at the loss of this member and extend its profound sympathy to his family; and further be it resolved, that this resolution be spread on the minutes, and that copies be sent to the Mayor of Evanston, the members of his family, and the editor of the Association for publication in the Journal.

A resolution urging the executive committee to hold the 1927 annual meeting in Chicago was adopted unanimously.

The following officers were elected for the coming year: Chairman, W. R. Gelston; vice chairman, G. C. Habermeyer; treasurer, H. E. Keeler; trustee, L. R. Howson.

The officers of the section now are W. R. Gelston, chairman; G. C. Habermeyer, vice chairman; C. M. Roos, H. M. Ely, and L. R. Howson, trustees; and H. E. Keeler, treasurer. (G. C. Habermeyer will hold office as secretary until a successor is appointed.)

AMERICAN ROADBUILDERS' ASSOCIATION

The annual meeting of this association will be held on Friday, May 14th, at the Engineers' Club, New York City, at which time plans will be discussed for holding the 24th annual convention and road show in 1927. Charles M. Upham, business director of the association, president W. H. Connell, and treasurer James H. MacDonald will present reports to the association. A banquet at the Engineers' Club in the evening will be preceded by a meeting of the board of directors, at which two directors will be elected to fill vacancies caused by the death of Lewis S. Lauer and W. H. Stone. New officers will be installed as follows: H. G. Shirley of Richmond, Va., president; S. T. Henry, Spruce Pine, N. C., vice president; W. H. Connell, Harrisburg, Pa., ex-officio member of the board of directors; and F. A. Reimer, East Orange, N. J., R. Keith Compton, Richmond, Va., C. M. Upham, Raleigh, N. C., William Ogden, Cleveland, Ohio, and Frank Terrace, Orillia, Wash., re-elected directors, and W. H. Kershaw and C. M. Pinckney, both of New York, newly elected directors.

NEW JERSEY SEWAGE WORKS ASSOCIATION

On Friday, March 26, the New Jersey Sewage Works Association met at the State House in Trenton. Again, as last year, the number present was greater than the enrolled membership, visitors more than making up for the few member absentees. That the Association is local in name only was evidenced by the fact that those present represented territory from Cleveland, Ohio, to Boston, Mass., while the membership includes Seattle, Wash., Los Angeles and Berkley, Cal., and other far western cities.

In an opening address Director of Health Costill called attention to the overlapping of authority in the matter of making other than strictly sanitary sewage connections to collecting systems. He advocated shifting this authority from local boards of health to the superintendent of sewers. He also advocated giving the State Board of Health more authority over connections of industrial plants to completed sewer systems.

A discussion of "Surcharging of Sanitary Sewers by Run-offs from Melting Snow and Rain, and Its Effect on the Treatment Plant" followed the director's talk. This was a round table discussion and led to the appointment of a committee to take up with the Legislature the subject of officially placing the authority and responsibility for inspection and approval of connections with the municipal superintendent of sewers. This committee was also instructed to take up the matter of giving the State Department of Health more authority over industrial connections as suggested by the director.

Part 2 of the round table discussion took up Cleaning of Sewer lines and brought out some interesting data on troubles with fine sands and greases; also the necessity of proper cleaning tools, such as mechanical scoops and nozzles.

A report by a committee appointed last year set forth lists of tools which should be provided for each type of plant and recommended that proper housing for such tools be provided at every plant. Discussion brought out sentiment that a list of tools suitable for cleaning sewer lines should also be provided. The report was adopted and recommendation made that the State Board of Health require that the tools listed should be supplied as standard equipment and be included in the specifications for all new installations.

P. N. Daniels, a sanitary engineer of the state board of health staff, read a paper on Chlorination of Sewage, demonstrating his talk with the two units of the department's emergency apparatus. The paper noted "maximum dosages" as required by the department for different effluents more or less completely pre-treated. In answer to a question it was stated that "maximum" dose meant the capacity of dosing apparatus required by the department to be supplied in each case. There ensued a considerable discussion on the necessity for diffuser plates and on necessary submergence of chlorine discharge when gas is applied directly. The advantages of discharge directly into the current of flowing sewage as against discharge into quiet areas was also pointed out.

Frank W. Jones of Cleveland read a paper prepared by him in collaboration with Supt. Brown of the Marion, Ohio, plant on "Operating Data on Glass-Covered Sludge Drying Beds." Results compared with available data on open beds indicated that the covered beds allow of cutting the area required to one-third that of the open beds and showed that for this reason the covered beds are really cheaper to construct. In addition it was pointed out that the trouble and cost of taking care of the smaller covered area was a considerable factor. Studies of optimum depth to cover sludge beds, both open and covered, were also reported in this paper.

Richard Gould and Weston Gavett reported for the Research Committee on practical application of the findings of the New Jersey Sewage Experiment Station. Discussion of this paper was so animated and brought forth such rapid fire of questions and cross questions as to leave your reporter a little dazed as to just what was in the paper and what was in the discussion. Dr. Rudolfs, chief of the research laboratories, bore the brunt of the rapid fire of questions in a way that impressed all with his thorough mastery of the subject. All were also impressed with the completeness and thoroughness of the ground work which the laboratory has established during the past few years. Authoritative and startling new developments based on this ground work are now coming on rapidly. The following are some of the new developments brought out at this meeting:

Heating of sludge to the optimum temperature for digestion hastens digestion very materially, cutting the time by perhaps one-third.

Adjustment of reaction of the sludge to the optimum pH 7.3 to 7.6 without heat hastens digestion about as much as the heat alone.

The combination of optimum heat and optimum reaction (pH) will hasten the time of digestion out of all proportion to either one alone.

It is possible, by proper manipulation, to produce rapid liquefaction of the organic matter with very little production of gas; or to produce great volumes of gas if we wish to use the gas, say for heating the sludge.

It is possible by further manipulation of this combination to alter the character of the gases given off. We may produce almost pure methane or almost pure carbon dioxide, or we may produce only carbon dioxide and nitrogen gas.

By using tanks sealed against the admission of air in combination with the above manipulations we can increase, still more, the rate of digestion.

All of the above conditions are under control on a practical basis.

Another very practical point brought out was the limiting factor of ratio of fresh solids added daily to the amount of ripe sludge in the tank, and the possibility of pre-treating the fresh solids for the first few days in a separate tank to overcome this limitation.

We are assured by letter from a listener (who did not care to break in on the flow of developments at the meeting) that the heating of sludge during digestion is a very practical thing; in fact, absurdly simple and economical, even though we do not take advantage of the gases for use as fuel.

Announcement was made of a very practical and reasonable potentiometer for taking pH readings of sludges. This instrument can be home made and has no relation to the expensive and supersensitive instruments heretofore used. There is no poisoning of the electrodes by the sludge.

In response to many requests for a measure of "Good Sludge" which shall not involve merely personal opinion, such as consideration of color, odor, drainability, streaking, etc., Dr. Rudolfs said that attention had been turned to more exact chemical analysis and that reduction in volatile matter seemed to point the way, but involved the necessity of knowing the original volatile content, which it was often inconvenient or difficult to unobtain. The absolute value of the volital matter has no significance. (A development of the further points that he brought out will be given in an article by him to be published in "Public Works" next month.)

A committee appointed last year to consider the establishment of a course at the State University for sewage plant operators reported with recommendation of a rather complete outline for a three weeks' course and stated that the State College at Rutgers would be glad to undertake the instruction if sufficient demand for it developed. A resolution was passed asking cooperation of the State College and the State Board of Health with the Association. The resolution also asked the appointment of two representatives of each of the three organizations as a committee to complete arrangements.

During the afternoon session a moving picture of the Milwaukee activated sludge plant was presented through the courtesy of the Link-Belt Co.

NATIONAL HIGHWAY TRAFFIC ASSOCIATION

The annual meeting of this association will be held on Friday, April 30th, in the assembly hall of the Automobile Club of America, 12 E. 53rd St., New York City. At the afternoon session, beginning at 2:30, David Beecroft presiding, there will be an address on "The Trend of Motor Vehicle Legislation," by Russell H. Huffman, secretary, Motor Vehicle Conference Committee, National Automobile Chamber of Commerce; also one on "Synchronous Utilization of Highway Transport and Railroad Transportation," by George H. Pride, president of the Heavy Haulage Co.; also one on "Metropolitan Traffic Control," by Harold M. Lewis, executive engineer of the Regional Plan of New York and Its Environs; one on the "Economic Field and Future of the Rent-a-Car," by P. L. Emerson, president of the Yellow Manufacturing Sales Corporation; and one on "Organizations for Traffic Planning in Municipalities," by Professor Arthur H. Blanchard. There will also be a report by the National Committee on "Regulation of Pedestrian Traffic," the chairman of which is Professor Lewis W. McIntyre, civil engineering department, University of Pittsburgh.

In the evening at 8 p. m., Arthur H. Blanchard presiding, an address on the "High Cost of Bottle Necks on Highways," will be given by G. E. Hamlin, superintendent of repairs, Connecticut State Highway Department; one on

"High Speed Highways Required for Economic Transportation," by Ernest P. Goodrich, consulting engineer; one on "Illumination of Highways," by David Beecroft, Chilton Class Journal Company; one on "Aerial Photography as an Aid in Highway Traffic Surveys," by Charles F. Keale, Jr., chief engineer, Airmap Corporation of America; and one on "Highway Safety Promoted by Adequate Brakes on Motor Busses and Trucks," by David C. Fenner, manager Public Works Department, International Motor Company. Col. I. C. Moller, traffic engineer, Commissioners of the District of Columbia, chairman of the National Committee on Traffic Control Signal Systems at Street Intersections, will submit the report of that committee.

AMERICAN WATERWORKS ASSOCIATION

The 46th annual convention of this association will be held at Buffalo, New York, June 7th to 11th. The transportation committee, of which Walter H. Van Winkle, 50 Church St., New York City, is chairman, has arranged for a special train over the Lehigh Valley railroad, leaving Pennsylvania station, New York, at 8:50 a. m., Sunday, June 6th, Newark, at 9:24 a. m., Easton at 10:51 and reaching Buffalo at 7:55 p. m. Connection with this train can be made by leaving Reading Terminal, Philadelphia, at 9:20 a. m., and leaving Harrisburg at 8 a. m. on that day. Table d'hote dinner and luncheon will be served on the train for the party. Reservations for parlor car seats, compartments or drawing rooms should be made at once with the Chairman of the transportation committee. No tickets will be issued or reservation made unless accompanied by check payable to Walter H. Van Winkle, chairman, and covering payment in full for ticket and reservation. Following is the preliminary program, subject to change:

MONDAY

10:00 A. M.—Executive Committee Meets.

2:30 P. M.—Get-together Meeting to Discuss Experiences on the Following Topics:

1. Periodic vs. Continuous Readings & Billing for Water Companies and Departments—Discussion to be opened by H. P. Bohmann, James E. Gibson, Beekman C. Little.

2. Diversion of the Funds of the Municipally Owned and Operated Water Plant to Use of Other Departments of the Municipality—Discussion to be opened by Geo. H. Fenkell, John Chambers, J. E. Gibson.

3. Advantages and Benefits Derived from Waste Water Surveys—Discussion to be opened by F. E. Beck, C. C. Behney, E. S. Cole, H. F. Huy.

4. What is the Proper Location of Fire Hydrants to Minimize the Danger of Injury from Careless Drivers of Automobiles and Trucks?—Repairs to hydrants so injured. (a) Without removing broken barrel from ground. (b) Removing the broken barrel from ground. Discussion to be opened by W. W. Brush.

5. Use of Pulverized Fuel in the Water Works Plant— C. S. Denman.

6. Essential Log Data That Should Be Kept of the Daily Operations of the Plant by the Chief Engineer—Discussion to be opened by Isaac S. Walker.

7. Landscape Gardening and Improvement of Grounds Around Water Works Plant—Discussion to be opened by C. S. Denman.

2:00 P. M.—Meetings of Standardization Council Committees:

Committee No. 1—Standard Methods of Water Analysis—Jack J. Hinman, Jr., Chairman.

Committee No. 3—Practicable Loadings for Purification Processes—H. W. Streeter, Chairman.

Committee No. 19—Boiler Feed Water Studies—S. T. Powell, Chairman.

TUESDAY

9:00 A. M.—Services for Departed Members.
Address of Welcome by Hon. Frank X. Schwab, Mayor.
Address by Hon. John J. Love, Commissioner of Public Works.
Opening of Convention. Announcement of officers and trustees elected for the year 1926-27.
Report of Secretary, Treasurer and Executive Committee.
Action on Budget.
Award of John M. Diven Memorial Medal.
Report of Committee on Standard Specifications for Water Meters.
Report of Committee on Standard Brass Fittings.
Report of Committee on Standard Form of Contract of American Engineering Standards Committee.
Report of American Water Works Association Representative on Section Committee on Manhole Frames and Covers.
Report of Standardization Council.
New Business.
The Buffalo Water Works—George C. Andrews. Illustrated by lantern slides.

2:30 P. M.—Universal Metering—John Ericson.
Coordination of Fire Fighting Facilities—George W. Booth.
Securing Improved Technical Supervision of Water Purification Processes—H. E. Miller.
The Use of Standpipes and Elevated Tanks to Reinforce the Distribution System During Periods of High Demand—Nicholas S. Hill, Jr.
Election of Members of Nominating Committee.

8:00 P. M.—Water Works Manufacturers' Association Program—In charge of Edgar Buttenheim.

WEDNESDAY

9:00 A. M.—Strength of Cast Iron Pipe Manufactured in Various Ways—A. N. Talbot.
Progress Report of Committee No. 9—Standard Specifications for Cast Iron Pipe and Specials—Frank A. Barbour, Chairman.
Flow Surveys as an Aid to Fire Protection—George Fenkell.
Float Studies of Lake Currents—J. N. Chester.
Milwaukee's New Riverside Pumping Station—J. P. Schwada.

2:30 P. M.—Plant Management and Operation Division—James E. Gibson, Chairman.
Use of Two Water Mains in Wide Streets—Thomas F. Wolfe.
Water Supply Works of the State of Florida—E. L. Filby.
Standard Lengths of Cast Iron Pipe Cast Horizontally—J. R. McWane.
Service Pipes—O. B. Mueller.
Study of Year Round Soil Temperature from Zero to Depth of Six Feet Below Surface—Scotland G. Highland.
Fire Protection Division—Nicholas S. Hill, Jr., Chairman.

2:30 P. M.—Water Purification Division—J. W. Armstrong, Chairman.
Experimental Studies of Water Purification by U. S. Public Health Service—H. W. Streeter.
Earlier Determinations of B. Coli—Carl J. Lauter.
New Features of Water Purification Practice in Ohio—Frederick H. Waring.
What Laboratory Data is Actually Used by the Plant Operator in Controlling Purification on Plant Performance?—A. M. Buswell.
A Cemented Gravel Slab—Vitrified Clay Pipe Distribution System for Rapid Sand Filters—Harry N. Jenks.

6:00 P. M.—Dinner, Water Purification Division.

10:00 P. M.—Smoker, Compliments of Water Works Manufacturers' Association.

THURSDAY

9:00 A. M.—The Water Supply Situation in New Jersey—H. T. Critchlow.
Specifications for Riveted Steel Pipe with Regard to Hydraulic Characteristics—H. A. Stringfellow.
Distribution Feeder Survey as a Basis for Improvement Studies—V. Bernard Siems.

2:30 P. M.—Joint Meeting of Plant Management and Operation Division and Fire Protection Division.
Experience in New York State on Resolution to Discontinue Connections Between Public and Private Water Supply—C. A. Holmquist.
Discussion on Experience with Water Works Intakes in Great Lakes—George H. Fenkell.
Discussion on following:

1. Inspection of Valves and Hydrants; When and How Often Should They be Made?—Discussion to be opened by W. Zode Smith.

2. Experience with Turbine Type Water Meters; Over-registration due to Accumulation of Material on the Vanes of the Turbine—Discussion to be opened by R. B. Simms, James E. Gibson.

3. Records to be Kept of the Performance of Small Meters—Discussion to be opened by R. M. Roper, W. E. MacDonald.

4. Publicity for the Water Department: Acquainting the Public with the Operations of the Water Department in an Effort to Obtain Its Appreciation—Discussion to be opened by F. C. Jordan.

5. Accessories for the Mechanical Plant of the Water Works: CO2 Recorders; Draft Gauges; Mechanical Stokers, Manually and Machine Driven; Superheaters; Economizers; Recording Gauges; Main Station Meters; Boiler Feed Water Meters; Steam Flow Meters; etc.—Discussion to be opened by W. S. Cramer.

6. Experience with the Flushometer Type Watercloset; Advantages and Disadvantages from the Water Works Superintendent's Standpoint—Discussion to be opened by E. C. Groner.

2:30 P. M.—Water Purification Division—J. W. Armstrong, Chairman.

(Continued on page 50)

PERSONALS

C. N. Bass, for several years assistant state highway engineer of Tennessee and for six months past acting state highway commissioner, has been appointed commissioner.

Clarence C. Teaff, of Columbus, O., has been appointed city engineer of Daytona Beach, Fla.

Charles M. Reppert, formerly assistant director, Department of Public Works of Allegheny Co., Pennsylvania, has been appointed to the recently created position of chief engineer of the Department of Public Works of Pittsburgh.

Bayard F. Snow, formerly resident engineer on the Providence aqueduct, has been appointed resident engineer of the South Essex (Massachusetts) Sewage District, with headquarters at Salem, Mass.

A. C. Love, formerly county engineer of Liberty Co., Texas, and professor of civil engineering at Texas A. & M. College, has been appointed state highway engineer of Texas.

E. D. Gilman, assistant professor of civil engineering at the University of Cincinnati, has been appointed director of the new Department of Public Utilities of that city.

E. M. Shafter, for years employed in the engineering department of Royal Oak, Mich., has been made city engineer of that city.

John B. Wright, formerly city engineer of Keene, N. H., has been appointed city manager of Keansburg, N. J.

Harry C. Jessen, formerly acting city engineer of Salt Lake City, has been appointed as city engineer.

Joseph Strachan, for 25 years secretary of the Brooklyn Engineers Club and division engineer in the Brooklyn (N. Y.) Department of Highways, died March 22.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

AVERY'S ROAD MAINTAINER

The Avery Power Machinery Co., Peoria, Ill., announces a new power road maintainer for 1926. This is designed for properly maintaining dirt and gravel roads and streets. Points of special interest are the short 7-foot wheel base, which, combined with automobile type steering and brakes located on the differential shaft, enables the machine to turn in a 20-foot circle. The maintainer is equipped with a blade 12 feet 6 inches long but can be furnished with one 18 feet 2 inches long, making it possible to cover a wide strip of roadway. The blades can be raised or lowered instantly by motor power.

AVERY ROAD MAINTAINER

The motor is a heavy duty, 4 cylinder Waukesha with forced feed oiling system, completely housed and protected from the elements. All gears are enclosed and run in oil and both front and rear wheels are mounted on Timken taper roller bearings.

The maintainer has three road speeds—1¾ miles per hour, 2½ miles and 4½ miles. For the operator there is a spring mounted platform with cushion seat and back rest, and all control levers are in easy reach.

GLIDE PATROL GRADER

The Glide Road Machine Co., Indianapolis, has introduced a patrol grader which can be drawn by either Fordson or 10-20 International tractor. It has a rigid trussed frame and is known as the "Hy-Speed Maintainer." It is made with two blades operating at the same time for smoothing and trueing up the surface and also for leaving a gravel cushion to protect the road where desired. A scarifier and rooter attachment is furnished when wanted. For special fast work pneumatic tires are used, 35x5 Ford truck size with Timken bearings.

The manufacturers state that this machine has operated at a speed of 4.6 miles per hour with 8 and 12 foot blades used at the same time on some of the Minnesota state highways.

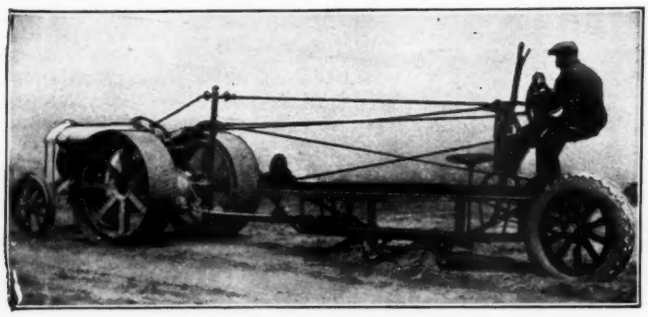
Both the tractor and the grader are in full view of the operator, who sits at the rear and, with universal control, is able to turn at right angles. The grader will cut shoulders and work on the sides of the road, the tractor traveling where the going is best.

ADAMS ONE-MAN MAINTAINER

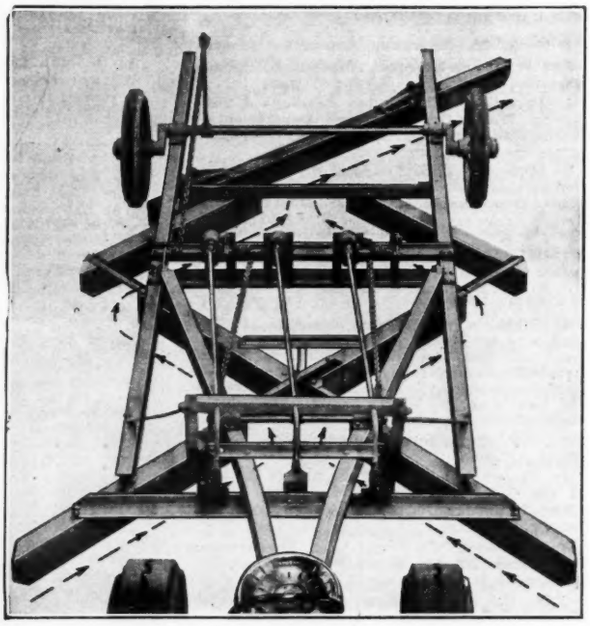
J. D. Adams & Co., Indianapolis, Ind., has recently introduced a new one-man road maintainer, No. 6, which can be hitched to any light tractor by means of a simple draw bar and clevis. It has 40 feet of blades which are rigidly fastened to the main structure and cut in the same plane and can be raised or lowered by the driver without moving from his position.

The maintainer is drawn by a v-shape draw bar which hitches to the tractor draw bar. With the exception of the draw bar and axle, the entire structure is one solid unit and rises and falls with the blades. The right and left sides can be raised independently by means of chains winding on shafts. All blades except the rear one are in a fixed position at 45 degrees with the axis. The rear blade is fastened to each main frame member by means of clamp brackets and can be adjusted to any desired position by loosening these, setting the blade, and tightening them again. By means of the lift controls, the depth of cut or pressure on the blades can be varied from nothing to approximately 3000 pounds. The rubber tired roller bearing wheels aid rapid and easy transportation of the machine.

The maintainer cuts a width of 9 feet and the blades work the material back and forth across these 9 feet four times in one passage.



GLIDE HY-SPEED MAINTAINER



ADAMS ONE-MAN ROAD MAINTAINER
Showing course of material cut loose by blades

CASE GAS ROAD ROLLER

The J. I. Case Threshing Machine Company, Racine, Wis., is introducing a new ten-ton gas road roller for which it claims unusual sturdiness and simplicity. The engine is the same 45-horsepower motor which has been used in the Case 24-45 horsepower tractor. This roller requires but one operator and he not necessarily a master mechanic, the machine being easy and simple to drive. The operator, standing on a roomy platform, has at all times a clear view of the front roller and all operating levers are near at hand. The front roller is made in four

NEW CATALOGS

AN AGGREGATE CLASSIFIER

The Perfect Classifier Co., Nashville, Tenn. An 8-page catalog of a machine for thoroughly cleaning concrete aggregate, gravel and similar materials.

STAR POWER SHOVEL

The Star Drilling Machine Co., Akron, O. A 4-page folder describing a power shovel with a boomless grading bucket.

HAGY DUMP WAGON

The James A. Hagy Wagon Co., Abingdon, Va. A 4-page folder describing 1-yard dump wagons with white oak bodies. Also contractors' carts.

GRAVEL SCREENS AND CONVEYORS

The Simplicity Engineering Co., Durand, Mich. Two 8-page folders describing vibrating screens and portable belt conveyors.

ROAD BUILDING EQUIPMENT

The Burch Plow Works Co., Crestline, O. A 16-page pamphlet describing portable conveyors and unloaders, gravel and stone spreaders, and iron culvert pipe.

ROAD FORMS

The Dravo Equipment Co., Pittsburgh, Pa. A 4-page folder describing Dravo steel forms for road construction.

TRACTOR WHEELS

The Tractor Grip Wheel Co., Toledo, O. A 6-page folder describing the advantages of "grid-iron-grip" wheels for Fordsons.

PERFORATED CONCRETE ROLLER

The Perforated Roller Works, Kankakee, Ill. An 8-page folder describing the advantages of the perforated concrete roller in consolidating paving concrete.

SAND AND GRAVEL WASHER

The Eagle Iron Works, Des Moines, Ia. A 4-page folder describing the Eagle sand and gravel washer.

COVERING GREEN CONCRETE

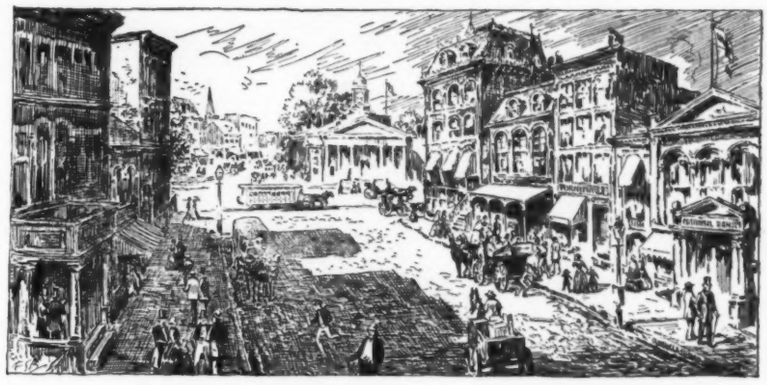
H. Lintz & Son, Fort Branch, Ind. A 4-page folder describing the Feigel covering machine, for handling the burlap blanket used for covering green concrete roller in consolidating paving

TRAFFIC CONTROL EQUIPMENT

The Highway Signal Co., Edgerton, Wis. A 4-page folder describing highway traffic buttons, danger signals and arterial signs.

PAINT SPRAY BRUSH

The Simons Paint Spray Brush Co., Dayton, O. A 16-page pamphlet describing a spray brush for painting water tanks, walls and other surfaces.



The Telephone and Better Living

PICTURES of pre-telephonic times seem quaint today. In the streets were horses and mud-splashed buggies, but no automobiles and no smooth pavements.

Fifty years ago homes were heated by stoves and lighted by gas or kerosene lamps. There was no domestic steam heating or electric lighting, nor were there electric motors in the home. Not only were there no telephones, but there were no phonographs, no radio and no motion pictures.

The telephone permitted the separation of business office from factory and made possible the effective co-ordination of widespread activities by a centralized organization. It changed the business habits of the Nation.

The amazing growth of the country in the past fifty years could not have come had not science and invention supplied the farmer, manufacturer, business man and family with many new inventions, great and small, for saving time and labor. During this period of marvelous industrial progress, the telephone had its part. It has established its own usefulness and greatly accelerated the development of the industrial arts which have contributed so much to better living conditions and to the advancement of civilization.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

WATER CONTROLLING APPARATUS

The Rodney Hunt Machine Co., Orange, Mass. Catalog No. 30, 3rd edition, 124 pages, describing flumes, penstocks, standpipes, gates and valves, trash, rocks and rakes, relief valves, gauges and fittings.

EQUIPMENT FOR FORDSON

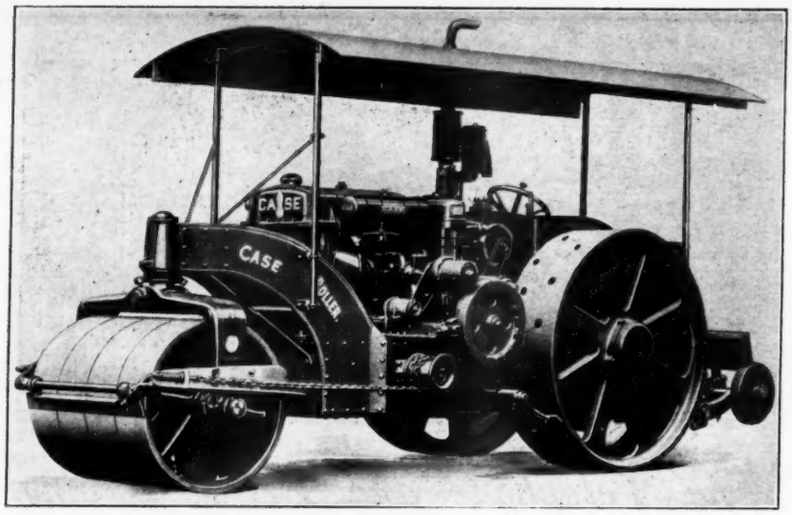
The Whitehead & Kales Co., Detroit, Mich. A 26-page catalog of special wheels, bumpers, cranes, trailers, street sweeper, flusher, etc., for use with the Fordson tractor.

HYDROGEN ION EQUIPMENT

The La Motte Chemical Products Co., Baltimore, Md. A 40-page pamphlet describing materials and equipment for the colorimetric determination of hydrogen ion concentration and for water analysis.

ROAD-BUILDING TRUCKS

The Autocar Company, Ardmore, Pa. A 48-page pamphlet, profusely illustrated with views showing Autocar trucks operating in all phases of road construction.



CASE TEN-TON GAS ROAD ROLLER

sections running loose on the front axle, which permits easy guiding. A scarifier is attached to the rear which is the same used on the Case steam rollers; it tears up the road for the full width of the roller if desired or can be adjusted as to width or depth. The picks are raised, lowered and held in the gound with an air-operated piston.

Under official test, with kerosene as fuel, the engine has developed 8.8 horsepower-hours per gallon on rated brake horsepower tests and 9.14 on maximum drawbar tests. Its road speed is 2 to 3 miles per hour. The crank shaft main bearings and connecting rod bearings are of bronze-back babbitted shell type. With air pressure of 150 pounds, the picks of the scarifier are forced into the ground with a pressure of about 8,000 pounds. The picks are 1½x2½ inches section and 25 inches long, of tool steel, accurately forged and carefully tempered.

The total length of the roller is 214 inches, total width 84 inches and total height 116 inches. The front rolls are 41 inches in diameter and 50 inches wide, while the rear rolls are 66 inches diameter and 19 inches wide. The shipping weight, equipped with scarifier and electric equipment, is about 22,000 pounds.

NEW SPEEDER DITCHER

The Speeder Machinery Corporation, Fairfield, Iowa, offers, as its latest attachment for use with the Speeder excavator, a ditcher or trench shovel. This ditcher is attached to the regular dipper shovel boom, after removing the dipper and sticks, thus requiring investment in only one boom for both types of shovels. The trench bucket is made in various widths, the 28-inch bucket, cutting a 38-inch trench, being most used. This bucket has a capacity of one-half yard and has a latch-operated, bottom-discharge door for loading into wagons and trucks. A special feature is a direct inhaul on the bucket, a single line being used. Variation in the hoisting and digging line speeds can be had by lagging the drums, and the digging line speed can be varied still more by using a low-speed clutch.

This ditcher digs to a depth of 16 feet and has ample dumping clearance, enabling it to load into trucks when necessary. The bucket is tripped from the cab and closes itself on the return stroke. The Speeder is a full revolving machine, caterpillar mounted. It handles both trench shovel and half-yard dipper shovel and, by changing booms, can be converted into crane or dragline using a half-yard bucket on 30-foot boom.

BRANDING TORCH

The Combination Blow Torch Manufacturing Co., Inc., Chicago, Ill., manufactures a branding equipment for branding all kinds of wooden tool handles and other equipment. Names, initials, monograms or trade marks can be used as desired. The torch handle is made of wood and does not

become hot and the fuel control valve handle remains cool at all times. The pump is of solid cast brass and is outside of the gasoline range so that no gas can get inside and dry out the leather washer. The gasoline flame is directed by the torch against the back of the branding plate, keeping it hot at all times.

HELTZEL BATCHER BIN

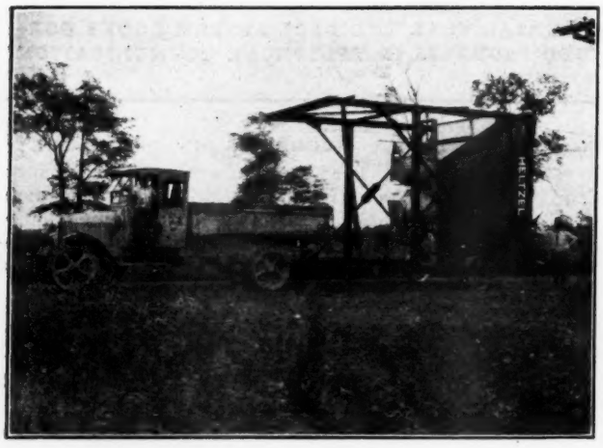
A description of this bin appeared in our February-March issue, but an illustration of the bin was not then available. We have since obtained an illustration showing it during transportation, and reproduce it on this page.

FOX 3,000 GALLON FLUSHER

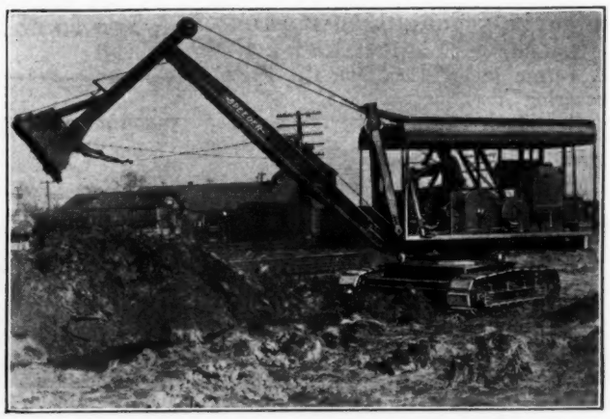
The Fox Rotary Snow Broom Company, Newark, N. J., has recently perfected a 6-wheel truck carrying a 3,000 gallon flusher designed especially for street flushing purposes. The truck drives and brakes on four rear wheels, which are pivoted as in the case of a trolley car truck, thereby greatly reducing the jar caused by one wheel passing over a hole or obstruction; this also permitting these wheels to track perfectly with the front wheels.

The engine is of the heavy duty type, six cylinder Buda. The transmission and clutch are of the heaviest type and best makes. The rear end is Timken make.

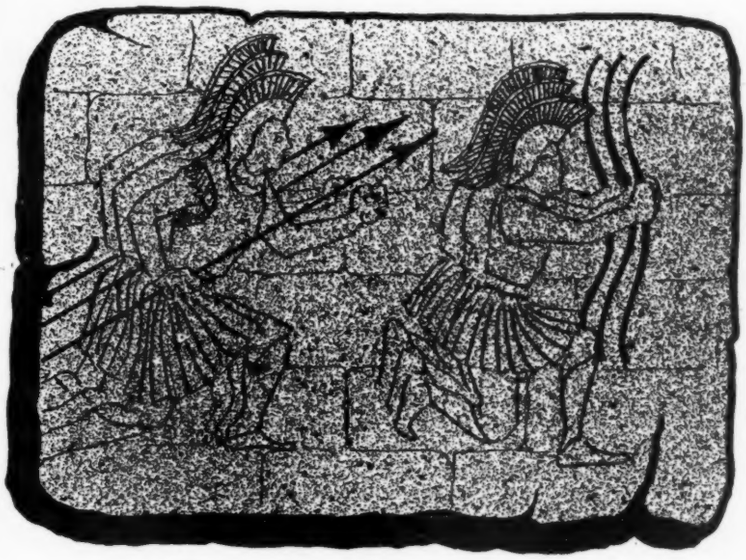
The tank is perfectly balanced on the six wheels and is electrically welded. Referring to the size of tank, the manufacturers state that a check made on the time consumed in filling flusher tanks showed that it requires an average of about 25 minutes for filling, only a small part of which is consumed in



HELTZEL TRAILER BATCHER BIN EN ROUTE



SPEEDER DITCHER OR TRENCH SHOVEL

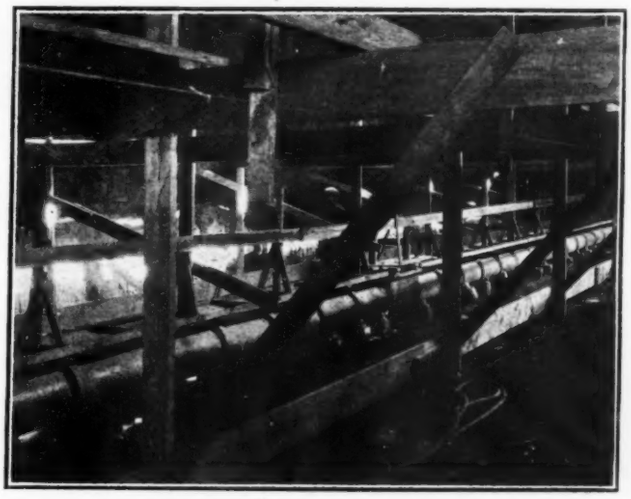


In The Golden AGE of Pericles

Vitrified Clay Pipe Was Already a Few Centuries Old

THE Golden Age of Pericles, was truly a remarkable period in the world's history. This was ancient Greece at its highest point of development, yet, even at that time, about 425 B. C., Vitrified clay was known at that time as a product that withstood the ravages of time.

Today Vitrified Clay Pipe for sewage and drainage purposes is still used by Municipalities. Nothing so far has been discovered to replace it. It is the ideal material for sanitary purposes.



View showing use of 15 inch Vitrified Clay Sewer Pipe beneath new subway, Philadelphia, Pa.

Vitrified Clay Pipe resists all corrosion. Being as slippery as glass, it offers no foothold for disintegration, and thus it can truly be said that it is made for permanence.

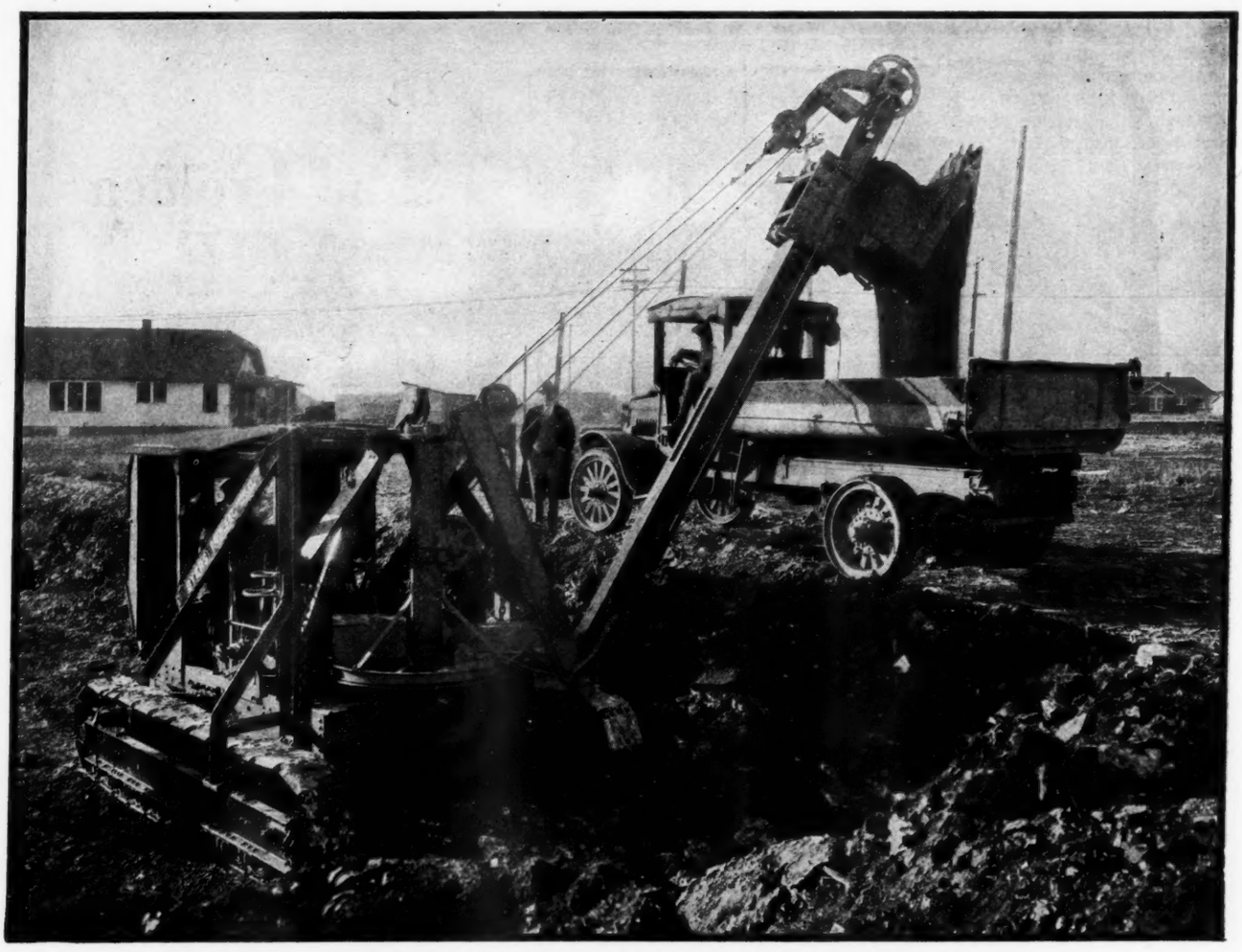
Complete information gladly furnished.

For permanence: —

It must be Vitrified Clay Pipe

EASTERN CLAY PRODUCTS ASSOCIATION
Colonial Trust Bldg., Philadelphia, Penna.

American Vitrified Products Co., Akron, Ohio
The Buckeye Fire Clay Co., Uhrichsville, Ohio
The Cambria Clay Products Co., Blackfork, Ohio
Clay City Pipe Company, Uhrichsville, Ohio
The Crouse Clay Products Co., Akron, Ohio
The Dennison Sewer Pipe Co., Dennison, Ohio
The East Ohio Sewer Pipe Co., Irondale, Ohio
The Evans Pipe Co., Uhrichsville, Ohio
The Junction City Sewer Pipe Co. Junction City, Ohio
Kaul Clay Manufacturing Co., Toronto, Ohio
The Logan Clay Product Co., Logan, Ohio
The Patton Clay Mfg. Co., Patton, Pa.
Penna. Clay Products Co., West Winfield, Pa.
Peerless Clay Manufacturing Co., Port Homer, Ohio
Portland Stone Ware Co., 49 Federal St., Boston, Mass.
The Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
The Robinson Clay Product Co., Akron, Ohio
The Robinson Clay Product Co. of Pennsylvania Clearfield, Pa.
The Romig Clay Product Co., Uhrichsville, Ohio
The Ross Clay Products Co., Uhrichsville, Ohio
St. Marys Sewer Pipe Co. St. Marys, Pa.
Stillwater Clay Products Co., Uhrichsville, Ohio
Union Clay Manufacturing Co., Empire, Ohio
The Wolf-Lanning Clay Co., Dennison, Ohio



New Model 26 Bear Cat with Skimmer attachment on grading job for city of Fort Worth, Texas

Here's the New Bear Cat Skimmer in Action—*Note:*

The Bear Cat is a favorite with public officials everywhere, because of its dependability, freedom from repairs, low cost, economy, and all-around usefulness.
Send for the "26" Bear Cat Book, describing all attachments.

1. Depth of subgrade and height of swing.
2. One man operation—you can see how operator trips bucket from cab, no ground man being employed.
3. Full caterpillar mounting—new large caterpillar shoes—pressure per square inch on ground only 8 pounds.
4. Character of the soil is plainly shown in this unretouched picture, but tough as it is, the Bear Cat handles it easily.
5. This picture shows the new combination boom, which handles either the skimmer or the ditcher bucket.

The BYERS MACHINE COMPANY, *Ravenna, Ohio*

Builders also of Byers Truckrane
Sales and Service Throughout the Country

THE ALL-PURPOSE ONE MAN CRANE

Skimmer — Ditcher — Backfiller
Clamshell — Shovel

BYERS BEAR CAT

THE BYERS MACHINE CO. PW 5-26
Ravenna, Ohio

Gentlemen—
Please send me the new Bear Cat Book. The type of work I am particularly interested in is

.....

Name .....

Address .....

Town .....

State .....

This advertisement appears in the April 1, 1926, issue of Engineering News-Record, and other construction papers.

Rock · Asphalt

FROM KENTUCKY

"Nature's Gift to Civilization"

The versatility of this remarkable paving material is shown by its constantly increasing use both for new construction and for resurfacing numerous types of worn-out pavements.

Its application is simplicity itself—no heating or mixing equipment is needed. Rock Asphalt is delivered on the job, ready to be LAID COLD.

Bituroc Rock Asphalt is so perfectly mixed by nature that the finished product is exactly the same as when it was removed from the ground—except that it has been thoroughly pulverized at our plant at Summit, Hardin County, Kentucky.

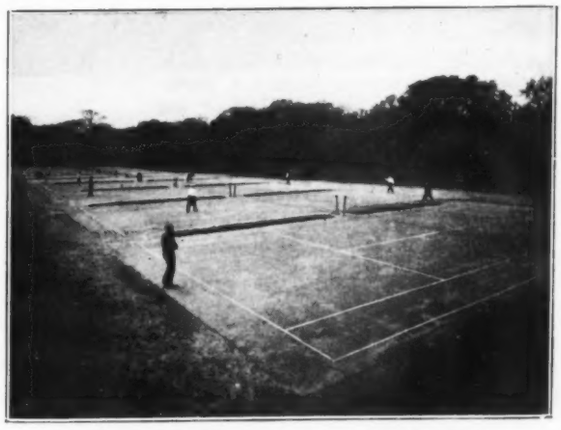
For a standard, heavy traffic, waterproof pavement, which is noiseless, dustless and exceptionally non-skid, use Bituroc Rock Asphalt.

WRITE FOR SPECIFICATIONS

OHIO VALLEY ROCK ASPHALT CO.
INCORPORATED

910 Schmidt Bldg. Cincinnati, O.

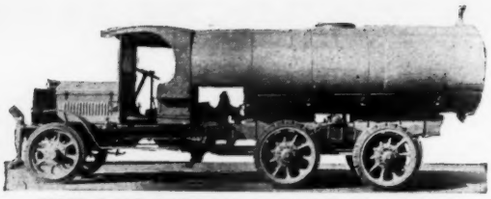
National Highway, Richmond, Ind.
Macadam Resurfaced with BITUROC.



BITUROC Tennis Courts, Detroit, Mich.

Richmond (Ind.)-New Paris (O.) Road

Bituroc
KENTUCKY ROCK ASPHALT
TRADE MARK



FOX 3,000-GALLON STREET FLUSHER

actually passing water in the tank, most of it being used in going to and from the hydrant, connecting and disconnecting hose, and opening and closing the hydrant. The ordinary modern 7-ton motor truck carries about 1600 gallons of water, and the Fox flusher, carrying double this amount, reduces by nearly fifty percent the amount of time required per gallon in filling the tank. As the load is distributed over six wheels, there is no danger of the heavy load injuring the pavement.

"SANITARY" SEWER CASTINGS.

The Sanitary Sewer Basin Co., Chicago, Ill., furnishes cast-iron catch basins, inlets, manholes, manhole tops and valve boxes, the details of which have been carefully worked out through experience in actual service.

Catch Basin.—The catch basin is made in three main parts—a bottom, a center section, and a top section. Part of the last extends above street level as a hollow curb, and in front of this is a gutter grating that can be swung back or lifted out when cleaning the basin. Water and dirt pass from the grating into a deep pan, at the back of which is a grate which retains the suspended matters but permits the water to pass through, down under the pan, and up through the outlet to the sewer. Water held in the depressed channel under the pan serves as a trap to prevent sewer gases from escaping.

The joint between the central and top sections is round in plan, so that the line of the curb face can be placed at any angle with that of the discharge pipe, and the height of the curb also is adjustable. The rear grate, front baffle plate and pan bottom are all removable for cleaning or repairs, or for rodding the discharge pipe.

The entire basin is of cast iron and can, it is claimed, be installed by two men in two hours after the hole has been dug, the depth of hole being only 3 ft. 1½ in. below gutter level. If roadway should later be widened the basin can readily be moved back

The refuse is drained out and held in the pan only 30 in. below gutter level, and can easily be removed by shovel.

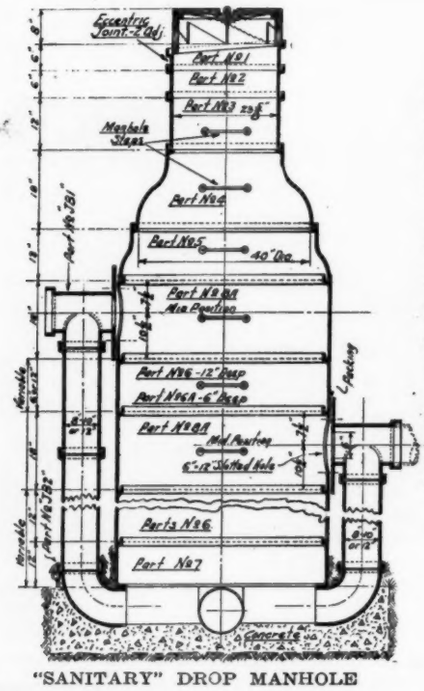
ring sits, the joint being made tight by calking cement or lead into the bell. The top joint is slanting, permitting setting the manhole cover at any desired angle with the horizontal; while the head is adjustable for height through a range of 6 in.

No masons are required—the men who excavate the hole can set the rings in place. No forms are needed, nor a hole wider than 4 ft. 2 in. It is water-tight. It can be removed and used again if desired. It can be set up in an hour or two after the hole has been dug and the back-filled at once.

Drop manholes can be built up by inserting two special sections (shown as No. 8A in the illustration) and outside riser pipes topped with special tees (No. J. B. 1).

Manhole Top—A special top for use on any manhole is made, which, by means

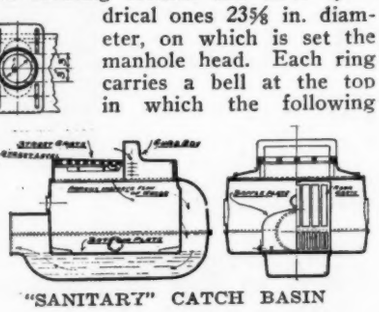
NORTHWEST GOOSENECK CRANE



"SANITARY" DROP MANHOLE

Inlet—The inlet has a gutter grating and adjustable hollow curb like the basin, but has no dirt pan, and the bottom is less than half as large in plan and the total depth is 10 in. less. Like the basin, it has a 12 in. discharge opening.

Manhole—A manhole is provided, round in plan, 4 ft. diameter at the bottom and 23⅝ in. at the top, which is all iron except the foundation of concrete. It is built up of cylindrical rings 12 in. high, of which any desired number can be used, ending at the top in two reducing sections and three cylindrical ones 23⅝ in. diameter, on which is set the manhole head. Each ring carries a bell at the top in which the following



"SANITARY" CATCH BASIN

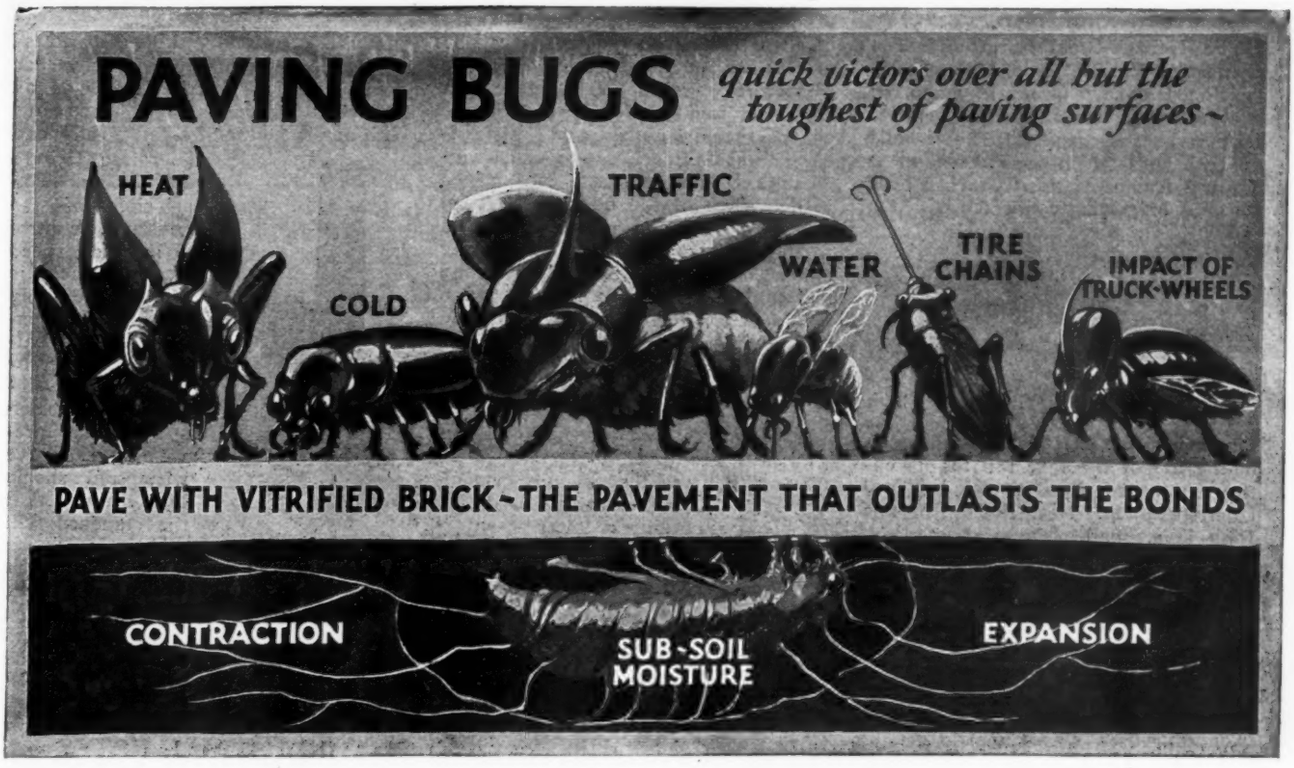
of telescoping rings, is adjustable as to height within a range of 6 in., and has a cover which locks on.

The same top is used on a cast-iron valve box made by the company.

NEW NORTHWEST GOOSENECK CRANE

The Northwest Engineering Company, Chicago, Ill., has recently perfected a crane equipped with a gooseneck boom for handling materials to piles from narrow alleys or for handling heavy pipe on sewer work. A single line handles either a log grappie, sling, timber tongs or hook block.

The boom is of the live type and the hoist cables are handled by a second drum on the machine which allows immediate control of the boom. The boom is of the lattice type. The cables run over large, easy running pulleys. The machine is powered by either gasoline or Diesel engine or by electricity. The crane is mounted on the standard Northwest crawler traction.



THE annual cost of a pavement is its first cost *plus* interest on its bonds *plus* every later expenditure for upkeep and repairs, *divided* by the number of its useful years.

From the instant it is laid, a pavement is subject to destructive forces. The jolt of heavy trucks tend to crack and pulverize brittle materials. Tire chains gnaw into soft surfaces. Contraction and expansion attempt to throw the riding surface into hummocks or to rend and shatter rigid construction. Freezing and thawing of sub-soil moisture racks any rigid pavement surface. Surface seepage, a milder but ceaseless enemy, accelerates decay of short-lived materials.

The combination of these forces wreck some surfaces in a few years. The hand of man, cutting trenches for underground installations, hastens this deterioration, unless the surfacing material can be lifted and replaced without requiring new material.

Only one pavement, at reasonable first cost, meets every modern condition—*the asphalt-filled vitrified brick pavement.*

VITRIFIED **Brick** **PAVEMENTS** **OUTLAST THE BONDS**

Its fire-hardened surface resists traffic wear indefinitely—scores of brick pavements are well beyond the 30-year mark. The elastic asphalt joint withstands the bending, jolting and heaving actions of heavy loads, temperature changes and subsoil freezing. Cross-trenches are economically cut because the asphalt joint, though a tight water-seal against seepage, keeps each brick a quickly removable unit that comes out and goes back into place with virtually 100% salvage.

To cap every other advantage, should the surface of a brick street or road, due to foundation failures, become uneven after a quarter-century or more of service, the original brick can be relaid and a smooth, renewed pavement secured at a small fraction of the first cost of any other known pavement!

Moral—advocate vitrified brick for pavements in your community.

I would be glad to receive a free copy of book, "Brick Roads Outlast the Bonds," containing facts and figures on paving costs taken from public records.

Name _____

Address _____

City _____ *State* _____

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

HELTZEL FACE RAIL CLAMP

The Heltzel Steel Form and Iron Company, Warren, Ohio, has recently developed a new face rail clamp, or overhead hanger, for curb and gutter forms which is made with hook bolts on both ends which hook down on to the top flanges of the front and back rails. A long wing connected with the

face rail clamp extends through a slot in the top of the face rail for its entire depth and prevents the face rail from spreading. Near the top of this wing is a small piece of angle iron which rests on the top of the face rail, preventing it from creeping up and giving clearance under the face rail clamp for the use of finishing tools. The division plate is made with long wings on each end which hook down through slots in the front and back rails, preventing them from spreading.

BAY CITY 16B EXCAVATOR

The Bay City Dredge Works, Bay City, Michigan, announces some changes made in its 16B excavator, the principal one being equipping the machine with full-size shoes, although the sizes of the clutches and bands are slightly increased and the skimmer ditcher trip rope is located so that the operator can reach and operate it doing away with the ground man. The crawler for the new excavator has a width of tread of 16 inches, a height of tread of 30 inches, and an overall length of tread of 14 feet 6 inches. The overall width outside of crawlers is 9 feet 1 inch and the overall top clearance of the frame is 11 feet 6 inches.

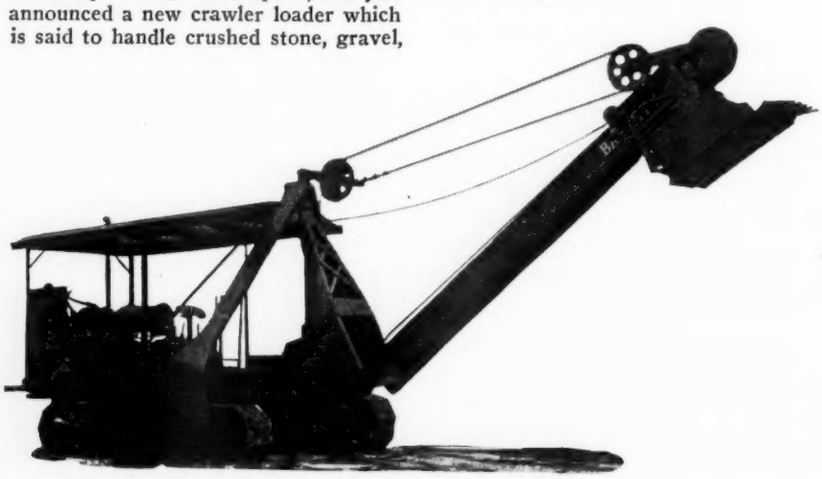
LINK-BELT CRAWLER LOADER

The Link-Belt Company, Chicago, Philadelphia and Indianapolis, has just announced a new crawler loader which is said to handle crushed stone, gravel, sand and similar materials at the rate of about 140 tons per hour. It can be driven and operated entirely by one worker of average intelligence. It comprises four units—the elevator, the chassis, the power plant, and the crawler. All moving parts are provided with Alemite fittings or grease cups placed within reach of the operator. It can travel forward and reverse and turn to the right or left when traveling in either directions. Starting, turning and stopping are all controlled by two hand levers. The elevator is controlled by a separate hand lever which operates a steel clutch and disengages automatically when the machine is started in reverse.

The buckets used are of special design, with reinforced edges and spaced more closely together than is customary on the principle that close spacing of buckets permits a lower speed of elevator and consequent reduced wear of parts. The buckets are carried on double strands of malleable iron and steel chain. The chute at the head of the elevator is of the swiveling type, turning through an angle of 180 degrees. The feeder consists of manganese steel paddles securely bolted to a hexagonal steel foot shaft and so arranged as to produce a steady feed of materials to the buckets.

The power plant is a gasoline power unit of 30 horsepower at 1200 r. p. m., or an electric motor equipment if desired. The truck transmission has three speeds, 33 feet and 66 feet per minute forward and 29 feet reverse. Machinery housing encloses all driving and control machinery for both crawler and elevator, is dust-tight and partly filled with oil, assuring sufficient lubrication of all parts. The drives are all roller chains running on steel sprockets and are protected by sheet steel guards.

The crawler is of channel and plate construction riveted together making a rigid housing for sprockets and idlers. A special design of shoes and sprockets secures a self-cleaning crawler traction tread; and the rollers are of large diameter, thus keeping the bearings up out of the dirt.



BAY CITY 16B EXCAVATOR

DUFF JACKS

The Duff Manufacturing Co., Pittsburgh, Pa., manufactures a governor control self-lowering jack, made in six sizes with capacities of 15 to 50 tons with ample factor of safety, which can

be raised 15¼ to 23½ inches. The principle of the governor control of lowering speed of lifting jacks is said to be entirely new and an exclusive Duff patent. The governor absolutely controls the lowering speed and prevents excessive wear and shock. It is claimed that the standard will not turn and screw out from under the load; that a triple-pawl holding clutch holds all the raise with each stroke; and that a positive stop at the base of the standard absolutely prevents over-extending of the jack beyond the safe limit of raise.

INDUSTRIAL NOTES

PRESIDENT OF DU PONT DE NEMOURS & CO.

The directors of E. I. DuPont de Nemours & Co., Wilmington, Delaware, on March 15 elected Lammot du Pont as president of the company; the retiring president, Irenee du Pont, being made vice-chairman of the Board of Directors and chairman of the finance committee.

CLIMAX REPRESENTATIVES

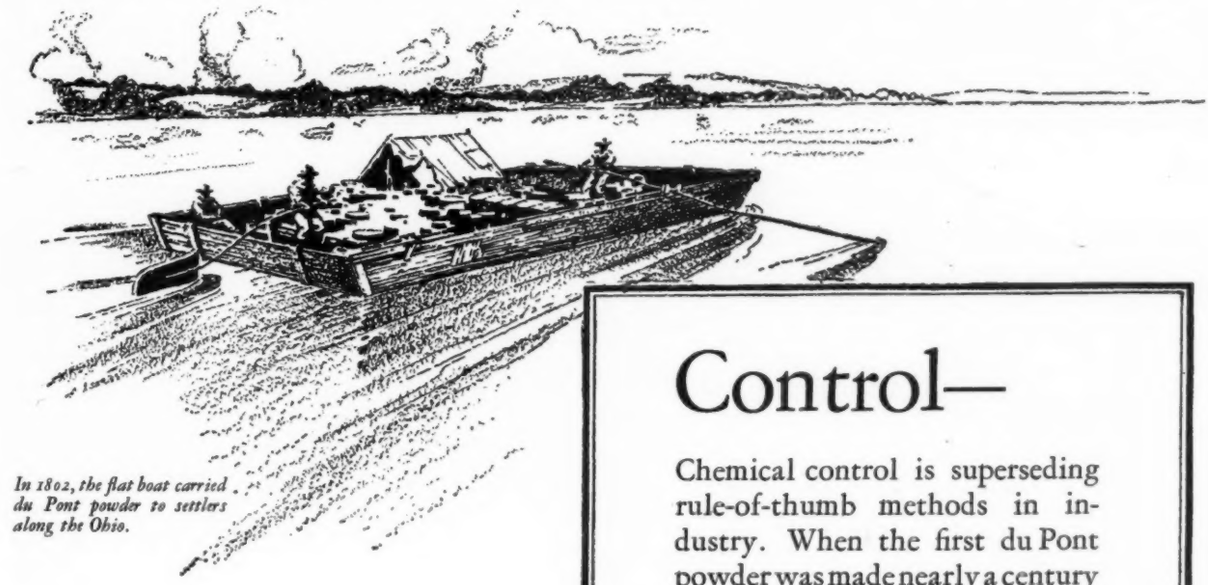
The Climax Engineering Co, Clinton, Ia., has appointed the J. L. Latture Equipment Co., 354 Belmont St., Portland, Ore., sales representative for the states of Oregon, Washington and Idaho.

The Climax Engineering Co., Clinton, Ia., has appointed Rapp-Huckins Co., Inc., 59 Haverhill Street, Boston, Mass., as district representative for the sale of industrial power houses and engines. Also H. Y. Smith Co., 1301 First National Bank Building, Mlwaukee, Wis., for eastern Wisconsin; A. K. Miller Engineering Co., 112 North Water St., Mobile, Ala., for southern Alabama; L. H. Staley, 515 Whitney Bldg., New Orleans, for Louisiana; Briggs-Weaver Co., Dallas, Texas; Clark Machine Co., Wichita Falls, Texas, for engines for oil drilling purposes; the Petroleum Electric Co., Tulsa, Okla. P. J. Dasey, of Tulsa, is in charge of the Southwestern sales territory.

GOULDS PUMPS, INC.

The firm which since 1869 has done business under the name of the Goulds Manufacturing Company, has changed its name to "Goulds Pumps, Inc.," this change being effective

MAKERS OF POWDERS SINCE 1802



In 1802, the flat boat carried du Pont powder to settlers along the Ohio.

Control—

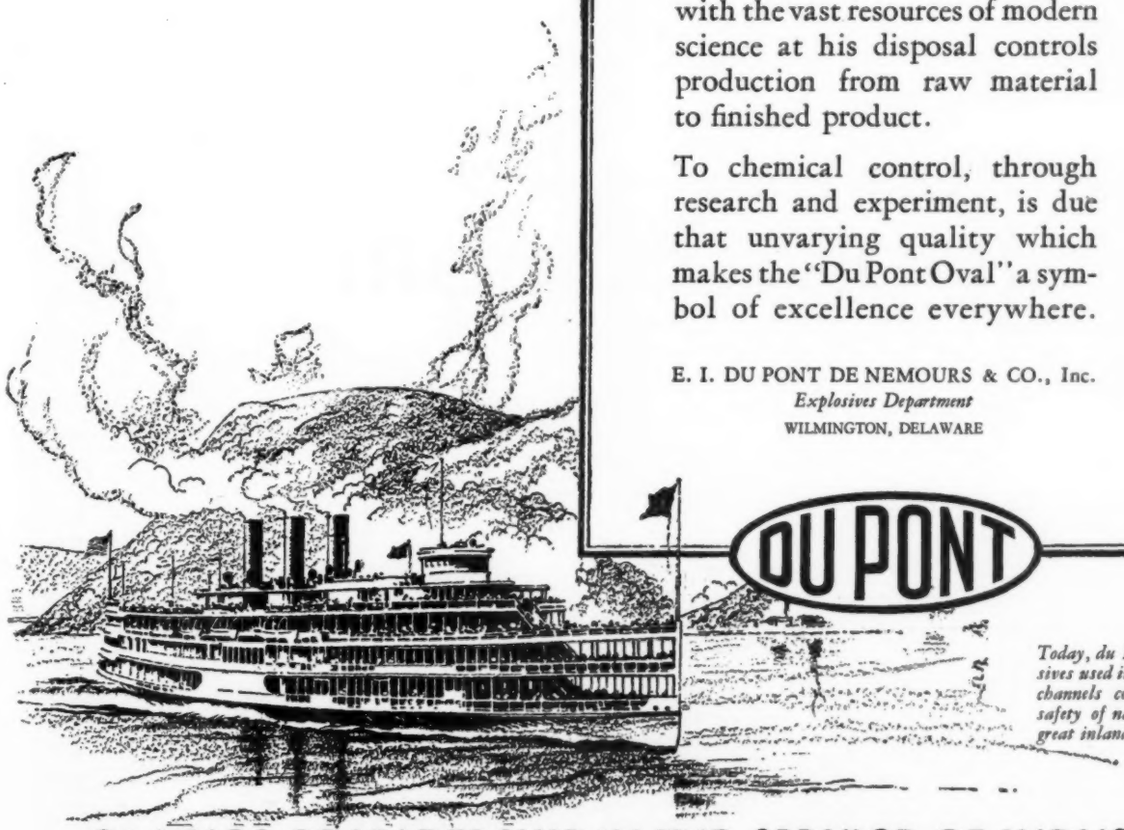
Chemical control is superseding rule-of-thumb methods in industry. When the first du Pont powder was made nearly a century and a quarter ago—chemistry was not an exact science.

Today, the chemical engineer with the vast resources of modern science at his disposal controls production from raw material to finished product.

To chemical control, through research and experiment, is due that unvarying quality which makes the "Du Pont Oval" a symbol of excellence everywhere.

E. I. DU PONT DE NEMOURS & CO., Inc.
Explosives Department
WILMINGTON, DELAWARE

DU PONT



Today, du Pont high explosives used in deepening river channels contribute to the safety of navigation on our great inland waterways.

123 YEARS OF LEADERSHIP IN THE SERVICE OF INDUSTRY

April 1st. There is no change in organization, business policy or ownership and the board of directors, officers, managers and personnel remain the same.

FEDERAL METER CORPORATION

The Federal Meter Corp., East Orange, N. J., announces that Edward Shedd, formerly with the Thompson Meter Co., is now associated with the sales force of the Federal Meter Corp., and will cover the New England territory.

INGERSOLL-RAND COMPANY

The Ingersoll-Rand Company, New York City, announces the appointment of Harlan A. Pratt as manager of the oil and gas engine department. Mr. Pratt was for many years with the Westinghouse Electric & Manufacturing Company and was later sales manager of the Atlantic Elevator Company and of the Elevator Supplies Co.

SANDERSON-CYCLONE DRILL CO. EXPANSION

On January 1, the Sanderson-Cyclone Drill Co., Orrville, Ohio, purchased the motor division of the Wellman-Seaver-Morgan Co., of Cleveland, Ohio, this including all drawings and patterns, special machinery, inventory and good will of W-S-M engines. The physical property has been moved to the Sanderson Company's new factory at Orrville. Practically all the former heads of the engineering and manufacturing departments of the motor division of the W-S-M Company have been taken over by the Sanderson Co. There will not, therefore, be any radical changes in the engineering or manufacturing policy, but the change is chiefly in the location, executive control and selling and servicing policies.

NEWS OF SOCIETIES

(*Continued from page 39*)

Observations and Experience in Eighteen Months' Operation of Detroit Filtration Plant —W. M. Wallace.

Treatment of Public Water Supplies for the Prevention of Corrosion and Red Water—John R. Baylis.

Experiences with Manganese in the Croton Water Supply—Frank E. Hale.

New Rapid Sand Filtration Plant, Washington, D. C.—P. O. Macqueen.

Test and Operating Results of the Lime Dry Feed and Slaking Machines at Wheeling, W. Va. Filtration Plant—J. F. Laboon.

General Discussion on the topic: What is the Purpose of the Underdrain System and Gravel Layer in a Mechanical Filter?—Discussion to be opened by A. M. Bushwell.

7:00 P. M.—Dinner-dance, informal. Compliments of Water Works Manufacturers' Association.

FRIDAY

9:00 A. M.—The Present Status of the Use of Iodides in the Minneapolis Water Supply—A. F. Mellen

Mosquito Control in Relation to Impounded Water Supply—Dr. J. A. Le Prince.

Progress on the Missouri River Water Works at St. Louis—John C. Pritchard. Illustrated with lantern slides.

General Discussion of the following Topics:

1. Maintenance and Upkeep of Filter Plant Recording Gauges, Controllers, with Reference to Adjustments.

2. Troubles with Coagulating Basins Due to Foaming and Overturning. How Often Should They be Cleaned?—Discussion to be opened by George D. Norcom.

3. Experience with Air-bound Filters. Causes and Remedies.

4. Experience with Dewash of Filters. Is It Justifiable?—Discussion to be opened by James M. Caird, C. W. Smedberg.

5. Experience in the Control of Filter Plants Using Hydrogen-Ion Method—Discussion to be opened by W. A. Taylor.

2:00 P. M.—Joint Session of Plant Management and Operation—James E. Gibson, Chairman.

Discussion on following topics:

1. Algae, Treatment of Reservoir, Recent Experience—Frank E. Hale.

2. Flushing Mains; Experiments to Overcome Odors and Taste Due to Algae and Other Growths. District Flushing—Discussion to be opened by W. S. Cramer.

3. Sterilization of New Water Mains After Laying and Before Put Into Service—Discussion to be opened by W. W. Brush.

4. Experience with the Use of deLavaud Centrifugally Cast Cast-Iron Pipe—Discussion to be opened by P. J. Hurtgen, Frederick W. Albert, R. E. Findlay, James T. Sheehan, Stephen S. Taylor.

5: Experience with Cement-lined Cast Iron Pipe—Discussion to be opened by James E. Gibson.

2:30 P. M.—Water Purification Division.

The Hydraulic Jump as a Mixing Device—A. G. Levy and J. W. Ellms.

Special Features of Design of Buffalo Filtration Plant—Clarke D. Parsons.

Non-Condensable Gases in the Steam and Their Control by Conditioning of the Boiler Water—R. E. Hall.

Progress Reports of the following Committees of the Standardization Council:

No. 1. Standard Methods of Water Analysis —J. J. Hinman, Jr., Chairman.

No. 3. Practicable Loadings for Purification Processes. H. W. Streeter, Chairman.

No. 6. Industrial Wastes in Relation to Water Supply—Almon L. Fales, Chairman.

No. 18. Filter Sand, Testing and Recording —Paul Hanson, Chairman.

Chemicals

For Water Purification

For Treatment of Sewage

LIQUID CHLORINE

Single Unit Tank Cars | Multi-Unit Tank Cars (1-Ton Containers) | 150-lb. Cylinders

Chloride of Lime

Sulphate of Alumina

Highest Grades. Manufactured by

Pennsylvania Salt Manufacturing Co.

Executive Offices: Widener Building, Philadelphia

Representatives:

New York | Pittsburgh | Chicago | St. Louis

Works:

Philadelphia and Natrona, Pa.

Wyandotte and Menominee, Michigan

Chlorine Distributing Station, Babbitt, N. J.

NEWS OF THE SOCIETIES

June 5-7—CONFERENCE OF STATE SANITARY ENGINEERS. Annual meeting at Buffalo N. Y.

June 7-11—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.

June 13-19—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Philadelphia, Pa.

June 16-18—CONFERENCE OF MAYORS AND OTHER CITY OFFICIALS OF THE STATE OF NEW YORK. Annual conference at Schenectady, N. Y.

June 21-25—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

July 14-16—AMERICAN SOCIETY OF CIVIL ENGINEERS. Summer meeting at Seattle, Wash.

Aug. 23-25—NORTH CAROLINA SECTION, AMERICAN WATER WORKS ASSOCIATION. Sixth annual meeting at Asheville, N. C.

Sept. 6-13—INTERNATIONAL ROAL CONGRESS. Fifth congress to meet at Milan, Italy.

Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.

Sept. 21-23—INTERNATIONAL CITY MANAGERS ASSOCIATION. Annual convention at Colorado Springs, Colo.

Sept. 21-24—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Ashville, N. C.

Oct. 4-9—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Oct. 11-14—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting at Buffalo, N. Y.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

INDIANA SECTION, AMERICAN WATERWORKS ASSOCIATION

The annual meeting of this section was held at Purdue University, Lafayette, Indiana, March 25th and 26th. Charles Brossman described the development of the Boonville waterworks (see PUBLIC WORKS for April). Various methods of measuring liquids were shown under working conditions in the college hydraulic laboratory. Dr. A. J. McLaughlin, senior surgeon of the U. S. Public Health Service, spoke on the development of public health measures from early times to the present. Clarence Goldsmith, assistant chief engineer of the Fire Underwriters Association, speaking on the subject of "Fire Prevention," asked that proper state laws be passed and that adequate and continuous inspection and education of the public be secured.

In a paper on the development of the concrete industry, Professor W. K. Hatt suggested that a contractor be permitted to use as much water in mixing concrete as he desired, conditioned on his adding additional cement to provide the proper cement-water ratio. L. S. Finch, director of the Water and Sewage Division of the Indiana State Board of Health, and H. A. Dill, manager of the Richmond Water Company, called attention to some of the serious water shortages in the state and urged intelligent study and distribution of the available supply. John W. Moore, of Indianapolis, described the electrification of the Lafayette waterworks and stated that it had resulted in a very substantial saving in operating cost. Prof. A. W. Cole discussed the waterworks power plant and emphasized the necessity both for better boiler equipment and for more efficient operation of both old and new plants. John W. Toyne, of South Bend, discussed pipe laying methods, including the use of ditchers and backfillers. He urged the sterilizing of all new pipe lines before being placed in service. Relation between waterworks companies and departments and the public was the subject of papers by G. C. Staley of the Indianapolis Water Company, and E. A. Scott, director of public relations, Interstate Public Service Company.

The officers elected for the ensuing year were: president, H. S. Morse; vice president, John W. Moore; secretary-treasurer, C. K. Calvert; assistant secretary, Lewis S. Finch, all of Indianapolis; executive committee, F. C. Jordan, W. L. Younce, W. C. Ridgeway, Howard Dill, W. H. Durbin, Charles Brossman and I. L. Miller.

SAN FRANCISCO SOCIETY OF ENGINEERS

Under this name, there has been organized a society with a membership of about 500 engineers representing all branches of the profession. The object is to bring about cooperation among the engineers of San Francisco and vicinity and promote the social interests of its members. The society maintains a secretary bureau with offices at 952 Pacific Building. The officers are: C. H. Tucker, president; Glen B. Ashcroft, vice president; A. J. Capron, secretary; G. H. Geisler, treasurer, and William H. Phelps, R. C. Briggs, L. W. Hunt, C. T. Wiskocil and Louis L. Leurey, directors.

AMERICAN WATER WORKS CONVENTION

The program of the convention, to be held in Buffalo June 7 to 11, follows the preliminary program published in our May issue except in the following particulars:

Monday afternoon—Omit report of Committee No. 19.

Tuesday evening—Add the following Manufacturers' Association program:

Diesel Engine Driven Pumps, by Rodney D. Hall, Worthington Pump & Machinery Corporation.

New Automatic Chlorinator, by Wm. J. Orchard, Wallace & Tiernan Co.

The Story of Sandspun Pipe, by Charles R. Wood, R. D. Wood & Co.

The Advantage of the Thin Plate Orifice vs. the Venturi Tube in Water Measurement, by G. D. Conlee, Republic Flow Meters Co.

From Mine to Consumer, a moving picture of the manufacture of brass pipe, by the American Brass Co.

Wednesday morning—Omit "Float Studies of Lake Currents," by J. N. Chester, and "Milwaukee's New Riverside Pumping Station" by J. P. Schwada; and add "Study of Currents in Lake Erie at Erie, Pa.," by D. E. Davis.

Also add meeting of Committee No. 19, Boiler Feed Water Studies, with the following program:

Water Problems Encountered in Railroad Practice, by S. C. Johnson.

Chicago & Northwestern Railroad's Progress of Water Treatment, by R. E. Coughlan.

Possible Future Developments on Railroads, by C. R. Knowles.

The Problem of Steam Boiler Corrosion, by Frank N. Speller.

Non-Condensable Gases in the Steam and Their Control by Conditioning of the Boiler Water, by R. E. Hall. (Changed from Friday afternoon.)

Wednesday afternoon—For "Fire Protection Division," Nicholas S. Hill, Jr., chairman, substitute "Report of Joint Fire Prevention Committee," Frank C. Jordan, chairman, and Franklin H. Wentworth, secretary.

Also add meeting of Committee No. 19, Boiler Feed Water Studies, with the following program:

The Effect of Temperature on the Liberation of Hydrogen Gas by Corroding of Iron and Zinc, by John R. Baylis.

The Potentiometric Determination of Hydrogen-Ion Concentrations as Applied to Boiler Waters, by Willard N. Greer and Henry C. Parker.

Automatic Hydrogen-Ion Control of Boiler Feed Water, by Henry C. Parker and Willard N. Greer.

Hydrogen-Ion Control in Water Purification, by Dr. W. A. Taylor.

Conductivity Methods of Measuring Condenser Leakage, by Henry C. Parker and Willard N. Greer.

EXHIBITORS

The following will exhibit in booths at the convention:

Wallace & Tiernan Co., Inc., Newark, N. J.

B. Nicoll & Company, Inc., New York City.

Mueller Co., Decatur, Ill.

The A. P. Smith Mfg. Co., East Orange, N. J.

Union Water Meter Co., Worcester, Mass.

Cement Lined Pipe Co., Lynn, Mass.

East Jersey Pipe Company, New York City.

F. B. Leopold Co., Inc., Pittsburgh, Pa.

Pittsburgh Testing Laboratory, Pittsburgh, Pa.

Pittsburgh Meter Co., Pittsburgh, Pa.

Worthington Pump & Machinery Corp., New York City.

The Central Foundry Co., New York City.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.

National Tube Company, Pittsburgh, Pa.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

Hays Manufacturing Company, Erie, Pa.
Sullivan Machinery Co., Chicago, Ill.
Chicago Bridge & Iron Works, Chicago, Ill.
Electro Bleaching Gas Co., New York City.
R. D. Wood & Co., Philadelphia, Pa.
Hersey Manufacturing Co., South Boston, Mass.
International Filter Co,, Chicago, Ill.
U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Giant Manufacturing Co., Council Bluffs, Iowa.
American Cast Iron Pipe Co., Birmingham, Ala.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Waterworks Equipment Co., New York City.
Layne & Bowler Co., Memphis, Tenn.
Victaulic Company of America, New York City.
Edward E. Johnson, Inc., St. Paul, Minn.
Neptune Meter Company, New York City.
Bingham & Taylor—W. P. Taylor Co., Successor, Buffalo, N. Y.
The Federal Meter Corporation, East Orange, N. J.
National Water Main Cleaning Co., New York City.
Columbian Iron Works, Chattanooga, Tenn.
Talbot Non-Corrosive Linings Co., Philadelphia, Pa.
Ford Meter Box Company, Wabash, Ind.
Buffalo Meter Company, Buffalo, N. Y.
Eddy Valve Company, Waterford, N. Y.
The Pitometer Company, New York City.
Gamon Meter Company, Newark, N. J.
The American Brass Company, Waterbury, Conn.
Ross Valve Mfg. Co. Inc., Troy, N. Y.
Rensselaer Valve Company, Troy, N. Y.
The Leadite Company, Philadelphia, Pa.
W. & L. E. Gurley, Troy, N. Y.
Paradon Engineering Company, Long Island City, L. I.
Edson Manufacturing Corporation, Boston, Mass.
Birch Manufacturing Co., Chicago, Ill.
Joseph G. Pollard Co. Inc., Brooklyn, N. Y.
Simplex Valve & Meter Co., Philadelphia, Pa.
The Ludlow Valve Mfg. Co., Troy, N. Y.
National Meter Co., New York City.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Builders Iron Foundry, Providence, R. I.
The Lock Joint Pipe Co., East Orange, N. J.
Barber-Greene Company, Aurora, Ill.
Badger Meter Manufacturing Co., Milwaukee, Wisc.
Michigan Valve & Foundry Co., Detroit, Mich.
Republic Flow Meters Co., Chicago, Ill.
Sims Pump Valve Co., New York City.
Wailes Dove-Hermiston Corp., New York City.
H. W. Clark Company, Mattoon, Ill.
Hydraulic Development Company, Boston, Mass.
Van Gilder Water Meter Co., Pleasantville, N. J.
The American Well Works, Aurora, Ill.
Iowa Valve Company, Oskaloosa, Iowa.
LaMotte Chemical Products Co., Baltimore, Md.
National Cast Iron Pipe Co., Birmingham, Ala.
Glauber Brass Manufacturing Co., Cleveland, Ohio.

BOSTON SOCIETY OF CIVIL ENGINEERS

At the annual meeting on March 17th, the following officers were elected: President, Charles M. Allen; vice-president, Frank E. Winsor; treasurer, Frank O. Whitney; secretary, John B. Babcock; directors, Raymond W. Coburn and Harry E. Sawtell.

U. S. GOOD ROADS ASSOCIATION

The annual convention of the U. S. Good Roads Association will be held in conjunction with that of the Bankhead National Highway Association and the U. S. Good Road Show during the week of June 7th to 12th, in Santa Monica, Calif.

At the business sessions, national, state and local good roads policies will be discussed. Also there will be automobile tours through Southern California, with visits to all the principal cities. The active work of promoting the program is being conducted by General A. J. Rountree, director-general of the three organizations.

BOSTON CHAPTER, AMERICAN ASSOCIATION OF ENGINEERS

This chapter, at a recent meeting, elected the following officers: President, E. A. Champlin; first vice-president, J. L. Bradford; second vice-president, H. L. Hardy; treasurer, A. B. Edwards; directors, L. L. Lecomte, A. E. Kleinert, Jr., C. L. Hammond, E. I. Gardiner and R. F. Lufkin. Director of the national board from District Number 12 and delegate to the convention, J. F. Gabel.

NATIONAL TRANSPORTATION AND SERVICE MEETING

Plans are being made for a three-day national automotive transportation and service meeting to be held in Boston, November 16th to 18th, by the Society of Automotive Engineers, to which all societies and associations interested in the subjects to be discussed are to be invited. On each of the three days there will be technical sessions in the afternoon and evening, and the second day an inspection trip to the maintenance plant of a local company which operates a great number of motor trucks will be made. The technical discussions will cover the problems of design, engineering, operation and maintenance of trucks and motor coaches, including freight handling and store-door delivery by automotive equipment, the cost of operating gas-electric vehicles, maintenance tools, and so forth.

ASSOCIATED GENERAL CONTRACTORS BRANCHES

The Texas branch of the Associated General Contractors held its third annual meeting April 7th and 8th and elected as officers Thomas S. Byrne of Fort Worth as president; J. T. Haile of San Antonio, vice-president, and Dewey Darnell of Abilene as secretary-treasurer.

A Tulsa chapter has been organized and W. O. Morrow elected president, George Bowie, vice-president and R. Brandt, secretary-treasurer.

A new chapter was organized at White Plains, N. Y., April 16th to be known as the Westchester County Chapter. Frank S. Bache of White Plains was elected president; Alfred F. Barbarresi of Mt. Vernon, vice president; Robert Mackay of Yonkers, secretary, and Joseph Baltz of New Rochelle, treasurer.

Two new chapters have been added to the nine of the Texas branch, making eleven in all, these new chapters being located at Beaumont and Wichita Falls.

The Southern California chapter recently elected K. B. Bradley as president; C. E. Bressler, vice-president; Ralph E. Homann, secretary, and E. A. Irish, F. J. Twaits, George Hess, Godfrey Edwards, W. E. Burke and W. E. Allen, directors. The executive board appointed J. F. Hall treasurer, and Melville Dozier, Jr., as manager.

The New York State Highway Contractors at their annual meeting on April 20th favored affiliation with the A. G. C. and the subject was referred to the members for ratification.

The Seattle Chapter on April 20th elected A. S. Downey, president; Charles W. Carbeek, vice-president; A. M. Strandberg, secretary; H. V. Bogert, executive secretary, and Alfred Carlson, treasurer.

MONTANA SECTION, A. W. W. A.

The first annual meeting of the Montana section of the American Waterworks Association was held in Butte, Montana, April 15th to 17th. Forty-five members and delegates registered. Trips were taken to Leonard Mine and Big Hole pumping sta-

tion. Papers were read as follows: "The Butte Water Supply," by Eugene Carroll; "Recent Progress in Waterworks Practice," by Mr. Jenson; "Waterworks Financing and Accounting," by Fred Buck.

Superintendent Willett of the Billings, Mont., waterworks, was elected as president; H. S. Thane, vice-president, and H. B. Foote, secretary-treasurer. The next meeting will be held at Billings.

SOUTHEASTERN WATER AND LIGHT ASSOCIATION

More than 100 delegates from seven states attended the 16th annual convention of the Southeastern Water and Light Association at Jacksonville Beach, Florida, April 27th to 29th. Officers were elected as follows: E. O. Sweet, Birmingham, Ala., president; O. Z. Taylor, vice-president for Florida; H. P. Powell for Georgia; R. L. Totten for Alabama; E. M. Foster for Mississippi; P. J. Scudder, for Tennessee; C. L. Korner for North Carolina, and B. B. Meng for South Carolina. Jackson, Miss., was chosen for the 1927 convention. There was an exhibit of waterworks machinery and appliances in the hotel lobby. Among the papers read was one on the "Sodium Iodide Treatment of Water to Prevent Goitre," by Beekman C. Little; "Coagulation with Sodium Aluminate and Alum," by H. A. Lilly; "The Necessity of Keeping Filter Plant Records," by E. L. Filby, sanitary engineer of Florida. There was an interesting discussion of the topic "When Are Cross Connections a Menace?"

TEXAS SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

This section held its spring meeting at Dallas on April 19th and at Houston on April 20th, to accomodate members in the northern and southern parts of the state respectively. George S. Davison and George T. Seabury, president and secretary of the national society, attended both meetings.

DETROIT ENGINEERING SOCIETY

This society on April 17th elected as president, George R. Thompson; as vice-presidents, Charles J. Peck and William F. Zabriskie, and secretary-treasurer, Donald K. Williams.

WESTERN SOCIETY OF ENGINEERS

This society held its spring meeting on April 21st and 22nd, at which a discussion of the highway system of the United States was given by Thomas H. MacDonald, chief of the Bureau of Public Roads, and the classification and growth of highway traffic was discussed by Professor H. E. Riggs. The regulations and taxation of motor vehicles as common carriers; motor vehicles in relation to railway transportation; road widths, speeds and traffic intervals in relation to the capacity of highways; financing road construction and maintenance; economics of highway transportation; operating costs, and other phases of highway transport were discussed.

PIPE SPECIFICATIONS COMMITTEE

A sectional committee of the American Engineering Standards Committee on specifications for cast iron pipe and special castings organized April 21st and 22nd under the guidance of a steering committee representing the American Waterworks Association, New England Waterworks Association, American Gas Association and American Society for Testing Materials. The following officers were elected: Chairman, Thomas H. Wiggin; vice-chairman, N. F. S. Russell; secretary, C. C. Simpson, Jr. Technical committees were organized on dimensions, on metallurgy, processes and tests, and on corrosion and protective coatings.

THIRD CLASS CITIES OF PENNSYLVANIA

The League of cities of the third class in Pennsylvania will hold its 27th annual convention at Hazleton, Pa., on August 31st and September 2nd and 3rd. Fred H. Gates of Wilkes Barre, is Secretary.

TEXAS ASSOCIATION OF SANITARIANS

This association has just published a book entitled "Applied Municipal Sanitation," which, we are informed by E. G. Eggert, secretary, is by no means an encyclopedia on sanitary engineering or public health engineering but endeavors to briefly present the fields of sanitation that are of interest to city officials, sanitarians, public health workers, and engineers engaged in the construction and the design of municipal sanitary improvements. Among the contributors to the book are Dr. C. W. Goddard, Profs. E. W. Steele and E. C. H. Bantel and a number of other physicians and sanitarians of Texas.

AMERICAN ROADBUILDERS' ASSOCIATION

The American Road Builders Association at its annual meeting in May, set the week of January 10th to 17th, 1927, as National Good Roads Week. Representatives from all parts of the continent will be invited to assemble in Chicago during that week for a highway meeting, and it is expected that about 40,000 will be in attendance.

FLORIDA ENGINEERING SOCIETY

At its meeting on April 19th, this society elected H. D. Mendenhall of Lakeland, president; G. W. Simons, Jr., and C. A. Brown, vice-presidents; P. L. Reed, secretary, and J. A. Mason, treasurer.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the Act of Congress of August 24, 1912, of Public Works, published monthly at New York, N. Y., for April 1st, 1926.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the state and county aforesaid, personally appeared James T. Morris, who, having been duly sworn according to law, deposes and says that he is the business manager of Public Works, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and, if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business editor and business manager are:
Publisher—Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.
Editor—A. Prescott Folwell, Montclair, N. J.
Managing Editor—A. Prescott Folwell, Montclair, N. J.
Business Manager—James T. Morris, White Plains, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total of stock.)
Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.
Sumner W. Hume, 243 West 39th Street, New York, N. Y.
James T. Morris, White Plains, N. Y.
A. Prescott Folwell, Montclair, N. J.
Contracting Pub. Co., New York, N. Y.
Stockholders of Contracting Publishing Co.:
H. F. Pomeroy, 33 W. 42nd St., New York, N. Y.
J. R. Breuchaud, 342 Madison Ave., N. Y. City.
Frank W. Skinner, 20 Vesey Street, N. Y. City.
H. F. Hackerdorn, Consumers Bldg., Chicago, Ill.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are:
Swetland Publishing Company, 239 West 39th Street, New York, N. Y.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

JAMES T. MORRIS, Business Manager.
Sworn to and subscribed before me this 31st day of March, 1926.
(Seal)
H. H. MINER,
Notary Public, No. 228, New York County.
Register's No. 8051
(Commission Expires March 30, 1928)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

SANITATION FINLESS DRUM SCREEN

The Sanitation Corporation, New York City, manufactures a finless drum screen and elevator which it recommends as a practical, low cost unit for clarifying sewage and trade wastes. All types of fins are eliminated, thus avoiding a most objectionable and troublesome feature of drum screens—the breaking up or comminuting of solids by the churning action of the fin. Screen and screening pit are combined and the elevator boot is set directly beneath the screen. Peripheral pin rack drive is provided to insure stability and economy. The screen slots have their length parallel with the direction of rotation.

The screen may be set for either full or part submergence and may be operated with or without brush cleaning mechanism. In the half submerged screen, the maximum water level comes practically at the axis of revolution and cataract cleaning effect is employed. The so-called full submerged is about 80% under water and uses simplified brush cleaning. The illustration shows a full submerged screen and its setting.

MONO-CAST CENTRIFUGAL PIPE

The American Cast Iron Pipe Co., Birmingham, Ala., announces that by June 1st, or perhaps earlier, it will be ready to furnish mono-cast centrifugal pipe manufactured in a plant just constructed after thorough experimenting and development work.

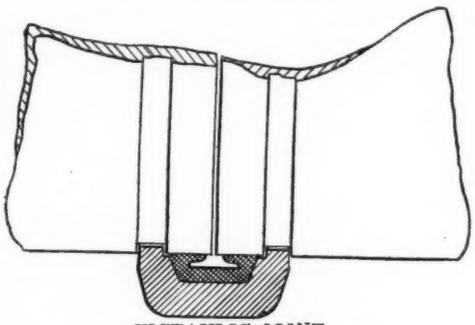
"Mono-cast" is the trademark name of the American Cast Iron Pipe Company for a centrifugal cast iron pipe made in a refractory mold. The development of this process has been in progress for years and a new plant to manufacture this product on a commercial basis has been constructed.

The mold in which a Mono-cast pipe is made is a metal flask lined with molding sand. After this mold has been placed horizontally in the centrifugal casting machine, a charge of molten iron is poured into it in bulk, distributing itself along the bottom of the mold from end to end.

When the point of proper distribution of this charge of metal is reached, the spinning velocity of the mold is very suddenly and greatly increased. There is a resulting development of centrifugal forces which takes place so rapidly that to all practical purposes it appears instantaneous. This force casts the molten metal onto the wall of the sand lined mold and every part of the pipe is formed at the same moment.

The company claims that, due to this method of manufacture, no internal casting strains are developed in the pipe and, being cast in a sand lined, or refractory mold instead of in a metal mold, the casting is not chilled, therefore brittleness of metal is avoided. In fact, a casting made by the Mono-cast method in structure is of the same nature as a casting made by the process using vertical sand-lined molds and cores which has so long been in use, except that the castings made by the Mono-cast centrifugal method is finer grained, much denser in structure, and free of inclusions.

Specifications for this pipe have been prepared by the company which, in all essential points, conform with the standard specifications of American Water Works Association; the principal difference being that, because of the greater density, uniformity and strength, the thickness of each class is about 20% less.

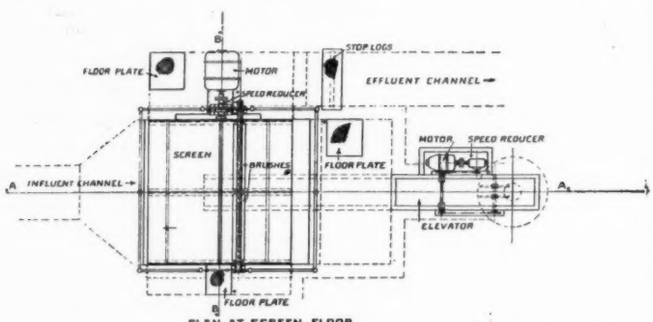


VICTAULIC JOINT

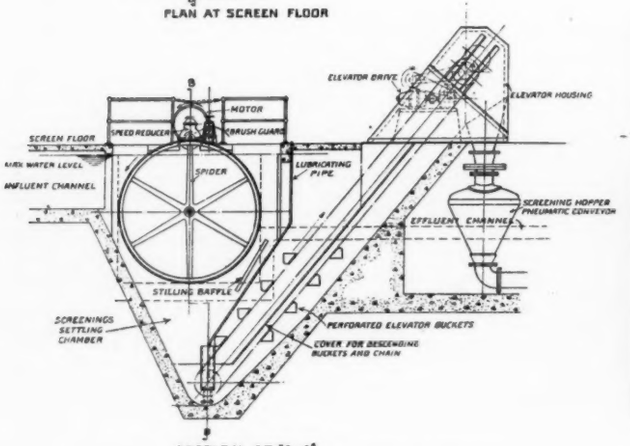
VICTAULIC PIPE JOINT

The Victaulic Company of America, New York City, is introducing a new design of pipe joint which is designed to take the place of ordinary flange, screwed sockets, or bell and spigot joints, for carrying water, oil or gas, for which they claim low cost of installation with unskilled labor, absolute tightness, flexibility under pressure, and that each joint acts as an expansion joint. It has been standardized for steel and cast iron pipes in sizes up to 12 inches inside diameter.

The joint consists of two half housings, two bolts and nuts, and a leak-proof ring of flexible material. The half housings serve to locate the leak proof ring over the ends of the pipe and also to join the pipes together,

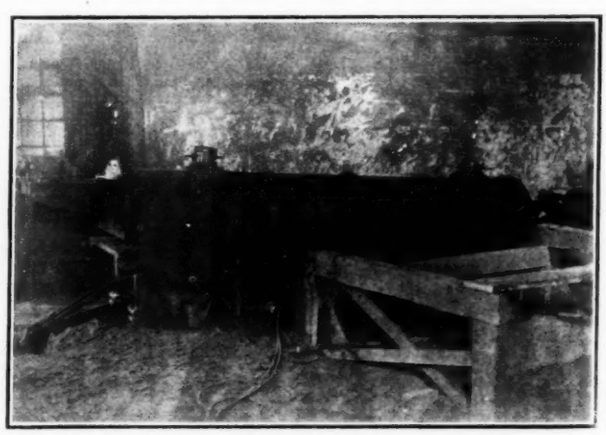


PLAN AT SCREEN FLOOR



SECTION AT "A-A"

SANITATION FINLESS DRUM SCREEN



MACHINE FOR SPINNING "MONOCAST" PIPE

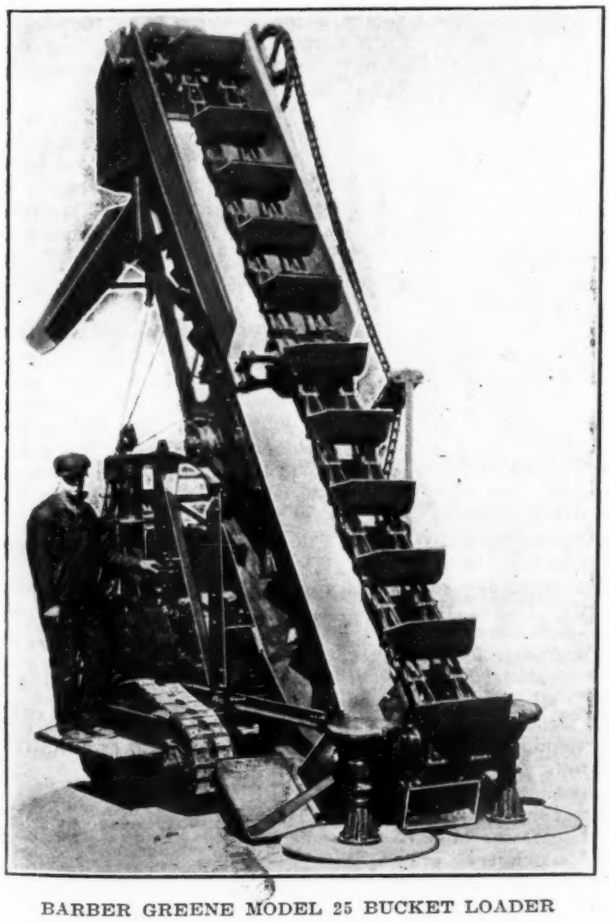
setting into a groove cut near the end of each pipe but with sufficient play in the groove to permit expansion and contraction and allow flexibility in the joint. The leak-proof ring is stretched over the pipe ends after they have been brought together and the two half housings are placed over it and bolted together. An annular opening in the ring receives pressure from the inside of the pipe through the joint, and, tending to expand the ring, causes this to cling to the pipe more tightly the greater the internal pressure. The housings are made of forged steel or malleable cast iron according to the pressures involved; and the bolt proportions are ample. Where thin pipes are used, they are provided with an upset or expanded end for receiving the metal housing.

Arrangements have been made with leading wrought iron and steel pipe makers to supply pipes adapted for Victaulic joints. Spun and sand cast pipes are made by these firms provided with beaded ends. For dealing with short lengths on the site, hand grooving tools are provided which are self centering on the pipe and automatically cut the groove to the correct depth. It is desirable that the end portion between the groove and the end of the pipe be as smooth as possible. Ordinary black pipe finish is generally satisfactory unless it is pitted or grooved, in which case the ends are trued when the groove is cut. For water or air lines, it is an advantage to paint or coat the end with a protective covering. No tools are required except a spanner and the joint can be assembled under water with no difficulty. The manufacturers claim that, with the pipes in position, a joint on any size up to 12" diameter can easily be made in less than 2 minutes by two men. A section of pipe can easily be removed and a new one replaced, or an entire line can be taken out and relaid, the same parts being used over again.

A NEW BUCKET LOADER

The Barber-Greene Co., Aurora, Ill., has just put on the market a new loader which it considers quite a step in advance in its line of apparatus for handling material. It is ordinarily provided with a 20 h.p. gas engine, but may be used with electric drive as well.

The main frame is built up of structural angles, channels and plates riveted together. The driving machinery is completely housed from dirt, with removable cover plates. It travels on crawlers, using self-cleaning links 10 inches wide carried on crawler frames built up of 7-inch steel channels and plates riveted together, making it very rigid and strong and providing a take-up for the crawler drive chain by means of filler blocks inserted in steel pockets. Each crawler is driven independently through a train of gears and chains taking power from the main jack shaft through external band clutches. It has speeds of 30 ft., 60 ft. and 100 ft. per minute, and 26.5 feet reverse out of the material. Alemite high pressure lubricating system with Industrial fittings is used throughout. Power is provided by either a General Electric 10 h.p. motor or a 20 h.p. Continental Red Seal gasoline power unit.



BARBER GREENE MODEL 25 BUCKET LOADER

The buckets are 18" by 8", of malleable iron spaced 18 inches centers carried on two strands of chain running on the same size chilled head and foot sprockets as used on the 42A loader. 30-inch patented revolving disc feed and scraper similar to that used on the 42A are provided.

The elevator boom is mounted on a curved track to which power is transmitted from the main jack shaft through a single strand of steel bushed roller chain to a safety sprocket with a breaking bolt on the head shaft.

CHICAGO AUTOMATIC CONVEYER

The Chicago Automatic Conveyor Co., Chicago, Ill., manufactures a troughed belt conveyor especially designed for road work, excavating, backfilling, unloading and loading cars and trucks, loading aggregate into hoppers, etc. The illustration shows such a conveyor 24-ft. long on an adjustable wheel frame. It is built in standard lengths of 12 ft. to 50 ft.

The belt is 18 inches wide, 4-ply, to which are riveted steel drags. It can be operated either by motor or gasoline engine. The delivering end can be changed or regulated from a horizontal position to an angle of 40 degrees. The belt is carried on troughed rollers. The nominal capacity is 60 yards per hour. The receiving end is made very thin and arranged so that it can be placed at the drop of a car or pushed into a pile of material.

CHICAGO BELT CONVEYOR

GLIDE PATROL GRADER

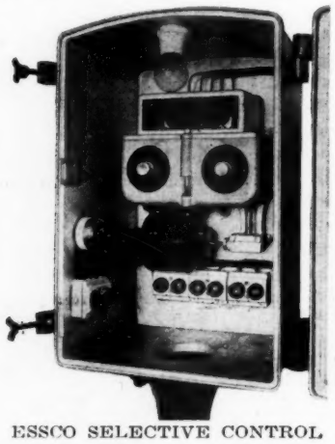
In describing this in our May issue we gave the address of the Glide Road Machine Co. as Indianapolis. The correct address is Minneapolis, Minn. The error unfortunately escaped the notice of the proofreader.

SELECTIVE CONTROL FOR TRAFFIC SIGNALS

The Essco Manufacturing Company, Peoria, Illinois, has developed and placed on the market a new motor-driven, direct-drive, selective control for traffic signals, which functions through the operation of a gear mechanism running in an oil bath and

operating clapper-type switches in a dust-proof housing. The mechanism consists of two cut-steel hardened timing gears which are alternately driven from a constant speed shaft. One of these two timing gears represents the time of period to be allowed traffic in one direction, and the other represents traffic in the cross-direction. Each timing gear is controlled from outside the housing by means of a hand-set timing indicator which moves over a definitely calibrated scale marked in seconds, reading from 10 to 150 seconds. The setting of these indicators at any definite scale causes the operation of the timing gear at the same time interval. These indicators can be set by simply loosening thumb-screws allowing for changing the timing on one street of an intersection, without in any way interfering with the timing on the other street of the same intersection.

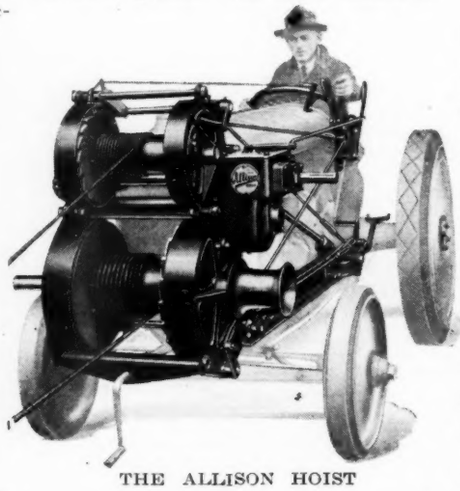
The cautionary or traffic change period is also adjustable, giving an exceedingly flexible arrangement for control. In addition, this control is so designed that the cautionary signals can be shown only when the green, or "go," signal is on and not when the red signal is on, thus overcoming a very grave weakness in the present traffic signal. Moreover, the cautionary period can be altered for traffic going in a second direction, thus giving more flexibility here.



ESSCO SELECTIVE CONTROL

The switches are of combination bakelite and heavy brass stampings, furnished with tungsten contacts and braided copper pigtails so designed as to eliminate practically all wear on any part. Mercury contacts can be provided, if desired. The panels supporting contacts are of bakelite rigidly supported and liberally proportioned. Connections are made through a terminal strip above, which is of bakelite with recessed binding screws. The whole of the electrical assembly is protected by an upper housing of aluminum furnished with a felt gasket and a plate glass front permitting an examination of the switches or contacts at any time and yet preventing the settling of dust on them or accidental touching.

The whole mechanism is driven by a s/20 horsepower motor provided with packed wool waste at either end and guaranteed by the manufacturer to run one year without oiling. This is direct-connected to a worm reduction gearing contained in a brass housing, the shaft being provided with a packing nut to prevent the leaking out of oil or grease. The whole control is mounted in the cabinet by means of three screws giving a three-point support. The control cabinet is of cast iron, provided with water-tight gaskets beneath the cabinet and the door. Below the controller are mounted the fused cut-outs for signals, also the transfer switch for hand control. The hand control may be mounted below the cabinet or can be mounted so as to be operated through one side of the control cabinet housing, if desired.

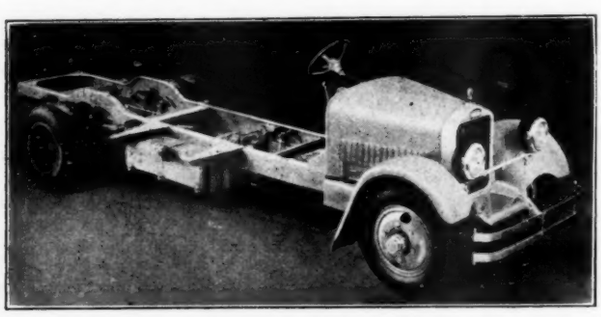


THE ALLISON HOIST

SMALL WHITE BUS CHASSIS

The White Company, Cleveland Ohio, announces that it will manufacture a new small bus chassis especially designed for a vehicle of smaller capacity than the standard size coach. to be known as the White Model 53. It has a wheel base of 180 inches and may be equipped with various styles of bodies, with baggage compartments and seats for 14 or 16 passengers, or bodies with capacities of 21 passengers without baggage compartments. A rigid drop frame provides for easy loading and unloading. Other distinctive features are balloon tires and progressive type springs affording the maximum of riding comfort. A new type of front axle with extra wide tread and an improved steering gear permit easy handling and short turning radius with balloon tires. It is of exceptionally sturdy construction throughout and, being very low, can be operated with safety at high speeds.

The hood is stream-line. The instrument board is of an improved type, giving compact arrangement of controls in easy reach of the driver. Budd disc wheels are standard equipment, as are low-pressure balloon tires 34x7.5 inches, single front and dual rear. If preferred, 34"x7" high pressure cord, single front and rear, may be used.



SMALL WHITE BUS CHASSIS NO. 53

ALLISON AUTOMOTIVE HOIST

The Willamette Iron and Steel Works, Portland, Oregon, manufactures a 2-speed automotive hoist to be attached to a Fordson tractor and for sale by Fordson dealers and distributors. A single-drum machine can be furnished and the second drum added later if desired. The 2-speed gearing is built into the hoist, the low speed being provided for above average pulls and the high speed for ordinary service. High, low and reverse gear shift is a part of the hoist and therefore does not impose heavy strains on the belt or chain drive as is the case where gear reduction is made on the Fordson power takeoff. In installing the hoist on a Fordson, it is not necessary to alter any part of the tractor.

The main drum develops a maximum line pull in low gear of 6,600 pounds, while the upper or haul back drum develops a fast line speed. At high gear, the pull on the main drum is 4,800 pounds. The main drum will hold 435 feet of 5/8 inch line or 750 feet of ½ inch line.

EAGLE SAND AND GRAVEL WASHER

The Eagle Iron Works, Des Moines, Iowa, manufactures a washer for sand and gravel which utilizes the tendency of lighter materials to float, in that the water, entering the bottom of a 24-inch tub 12 feet long, flows up through the material as it is conveyed up the

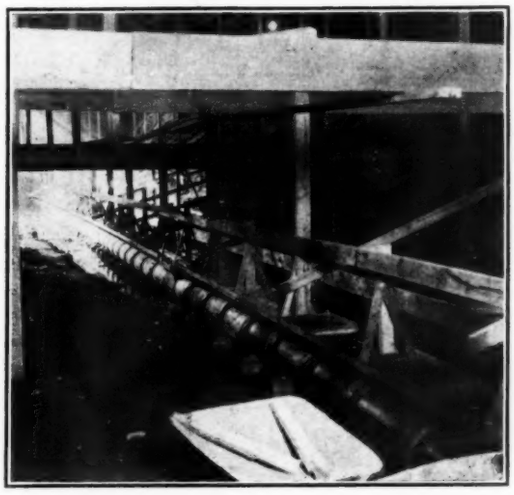
EAGLE GRAVEL WASHER

DEMETER of CRETE LIVED 1600 B.C.

Vitrified Clay was then 4400 years old!

People marvel at the ancient statues that are unearthed from time to time. This one of Demeter of Crete is still intact just as it was in 1600 B. C.

But Vitrified Clay has withstood the ravages of time even more. Vitrified Clay has been found that has lasted since 6000 B. C. The disintegrating action of nature has not affected it.



View showing use of 15" Vitrified Clay Sewer Pipe beneath new subway, Philadelphia, Pa.

Moderns have learned the use of Vitrified Clay from the Ancients—

Today modern cities have taken the word of the ancients and use Vitrified Clay Pipe for sewers, drains and chimneys.

The story of this product is interesting. Literature gladly sent to any one interested.

For permanence: –

It must be Vitrified Clay Pipe

EASTERN CLAY PRODUCTS ASSOCIATION
Colonial Trust Bldg., Philadelphia, Penna.

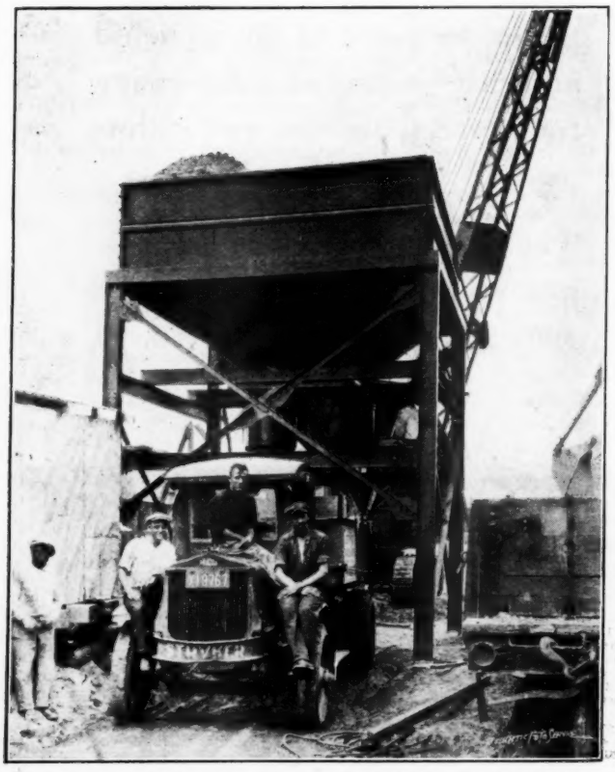
The Buckeye Fire Clay Co., Uhrichsville, Ohio
The Cambria Clay Products Co., Blackfork, Ohio
Clay City Pipe Company, Uhrichsville, Ohio
The Crouse Clay Products Co., Akron, Ohio
The Dennison Sewer Pipe Co., Dennison, Ohio
The East Ohio Sewer Pipe Co., Irondale, Ohio
The Evans Pipe Co., Uhrichsville, Ohio
The Junction City Sewer Pipe Co. Junction City, Ohio
Kaul Clay Manufacturing Co., Toronto, Ohio
The Logan Clay Product Co., Logan, Ohio
The Patton Clay Mfg. Co., Patton, Pa.
Penna. Clay Products Co., West Winfield, Pa.
Peerless Clay Manufacturing Co., Port Homer, Ohio
Portland Stone Ware Co., 49 Federal St., Boston, Mass.
The Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
The Robinson Clay Product Co., Akron, Ohio
The Robinson Clay Product Co. of Pennsylvania Clearfield, Pa.
The Romig Clay Product Co., Uhrichsville, Ohio
The Ross Clay Products Co., Uhrichsville, Ohio
St. Marys Sewer Pipe Co. St. Marys, Pa.
Stillwater Clay Products Co., Uhrichsville, Ohio
Union Clay Manufacturing Co., Empire, Ohio
The Wolf-Lanning Clay Co., Dennison, Ohio

inclined tub by means of a screw. This agitates and scrubs the material and the foreign matters float off over the lower end with the discharge water, while the clean gravel is discharged from the upper end of the washer. The dirty gravel is thus always moving against a clean stream of water. At intervals on the screw are placed agitators which constantly stir and agitate the material and cause a grinding action which breaks up mudballs, the material from which is then carried away by the water. Particles of coal, being lighter than gravel, are removed successfully.

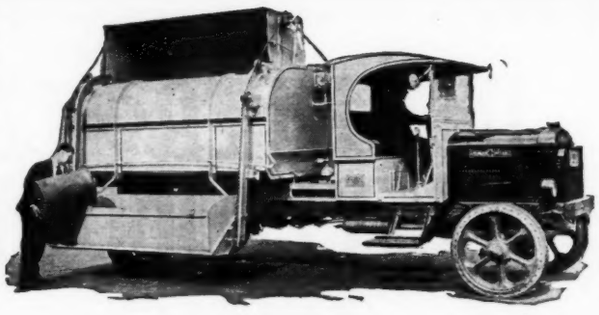
HELTZEL MEASURING BATCHER

The Heltzel Steel Form and Iron Co., Warren, Ohio, has recently developed a single control batcher which is said to perform the complete operation of filling, cutting off, dumping a batch of sand and stone, closing the lower gates and opening the upper ones in less than 10 seconds, by operating a single lever. The upper and lower gates automatically interlock so as to insure accurate and uniform batches, while provision is made for adjusting to compensate for bulking due to moisture content.

The sand batcher has a standard capacity adjustable between 8 and 14 cubic feet and the stone batcher between 13 and 28 cubic feet. Both have loading indicators to show when full or empty. The upper gates have 14-inch diameter openings and the slide cut-off rolls on line-point wheels. The lower gates have 18-inch diameter openings. The height overall when adjusted to 13 cubic feet capacity is 3 feet and when adjusted to 28 cubic feet capacity is 4 feet 8 inches. The batcher frame is drilled for attachment to practically any type of bin now on the market. The batcher is shipped completely assembled for operation, the shipping weight being approximately 1,400 pounds.



HELTZEL BATCHER AND SECTIONAL BIN BATCHING MATERIAL FOR 110 MILES OF CURB AND SIDEWALK AT ATLANTIC CITY



ATIA ASH AND GARBAGE MACHINE

ATIA ASH AND GARBAGE TRUCK

The Atia Corporation, New York City, has recently offered to cities a new style of truck body for collecting ashes, garbage and rubbish. This consists of a large tank, somewhat resembling that on a water wagon, capable of holding from 5 to 6 tons of garbage or ashes.

On the side nearest the curb is a long bucket, or hopper, which lowers to a point requiring only a 30 inch lift for a receptacle to be dumped into it. When the bucket is full, a lever is operated from the driver's seat and the bucket is drawn up with heavy chains by the motor and enters a hood at the top, where the contents are deposited into the tank.

The bucket so fits into the opening at the top of the tank that there is no flying dust or dirt during the dumping process, and after the bucket withdraws a metal curtain automatically drops, confining the dust or odor. The bucket may be filled as the truck stands at the curb or moves slowly along the street. When filled, it may be dumped in the tank while proceeding from one group of cans to another.

At the dump, a large door at the rear is automatically unlatched, the body is hoisted to an angle of 45 degrees, the door swings open and the contents slide out.

The chief advantages claimed are, that less dirt finds its way onto the streets and into the air, there is less heavy lifting for the men and less time is consumed in emptying the garbage and ash containers into the truck. It is furnished mounted on any make of truck chassis desired.

PAINT SPRAY BRUSH

The Simons Paint Spray Brush Company, Dayton, Ohio, manufactures an appliance for economically and rapidly spreading any preservative coating on wood or metal surfaces of any shape. It has no paint hose to clog up or wear out. The gun is attached to a one-quart or two-quart paint container and is provided with

PAINT SPRAY BRUSH

either 25 or 50 feet of braid-covered, extra strength rubber air hose with couplings. The air pressure is regulated by a valve, which is an essential detail in the operation since it controls the pressure required to atomize the liquid as it comes from the gun. For service where compressed air is not available, the company manufactures portable air compressors, the power for which can be obtained from an ordinary lamp socket. It is claimed that this brush will cover from four to six times as much surface as the old-fashioned bristle brush.

Service That Brooks No Delay

IN addition to the cost and inconvenience, shutting down a main water supply line for repairs presents many elements of danger.

Fire waits for no one. Sanitation holds no permanent check on epidemic, not to mention the clamor of the taxpayer or customer, or the bad effect on the housewife with the sink full of dishes, or the tubs full of clothes.

If good service is to be maintained and shutdowns reduced to a minimum, the main supply line should be composed of the most durable pipe.

That is why Cast Iron Pipe is generally chosen for this important service. It eliminates the common source of pipe line failures—corrosion.

If emergencies do arise, the Bell & Spigot Joint and the relatively short sections of Cast Iron Pipe make repair a simple and a speedy job.

On this page are shown several installations of Bell & Spigot Cast Iron Pipe on Main Supply Lines.

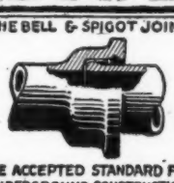
We will gladly furnish information on this, or any phase of the use of Cast Iron Pipe.

Address: RESEARCH ENGINEER
CAST IRON PIPE PUBLICITY BUREAU, PEOPLES GAS BUILDING, CHICAGO

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

INDUSTRIAL NOTES

REX-WATSON CORPORATION

On April 1st, the Watson Truck Corporation and the Rex Engineering Corporation consolidated under the name Rex-Watson Corporation, which will continue to manufacture bottom dump wagons, tractors and trailers, and baling machines.

DEATH OF L. R. LEMOINE

Louis R. Lemoine, chairman of the board of the U. S. Cast Iron Pipe and Foundry Company, died on April 23rd, following an illness of several weeks. He had been associated with this company and the McNeil Pipe and Foundry Company which it absorbed, since 1896, becoming president in 1911 and chairman in 1923.

PORTLAND CEMENT ASSOCIATION'S NEW HOME

The Portland Cement Association has moved its general offices from the Conway Building, Chicago, where it has been for ten years past, to its new building, at Grand Avenue and Dearborn Street. The entire building of five stories and two basements is occupied by the association and its research laboratory. The heavier laboratory testing machines are in the first basement, while lighter equipment, shipping and receiving rooms, etc., are on the main floor. On the second floor are the chemical laboratory and offices of the director of research. On the third floor are offices of the structural, railways and cement products bureaus and the association's reference library. On the fourth floor are stenographic and mailing departments. On the fifth floor are offices of the general manager, assistant general manager and several of the bureaus.

CHLORINE APPARATUS AT BUFFALO

Wallace and Tiernan Co. will display an entirely new line of chlorine control apparatus at the Buffalo convention of the American Waterworks Association. New compensator type units will be shown for both solutions and direct feed. They differ from the former compensator types in that the chlorine is measured under a vacuum and the possibiilty of leaks greatly reduced. The most important new development is an automatic vacuum type chlorinator which automatically proportions the flow of chlorine to the flow of water, tests showing an adjustment to within 1-3 to one percent. Another equipment is operated by the flow of water through a turbine type meter. Still another new device is the chloro clock, a special clock mechanism regulating the rate of application of a chlorine sterilizing solution. There will also be shown a special recording device attached to a platform scale, giving a chart record of the chlorine flow.

M. F. Tiernan, president, will be in charge of the exhibit assisted by William J. Orchard, G. H. Pratt, H. S. Hutton, J Van Benschoten, F. G. Merckel, R. B. Mowry, V. Pisanti and L. H. Rooney.

CIVIL SERVICE EXAMINATIONS

Physicist, Associate Physicist, Asistant Physicist—Receipt of applications for these positions will close June 8th. To fill vacancies in Bureau of Standards and the Bureau of Mines at entrance salaries of $3800, $3000 and $2400 respectively with possible advancement in pay without change in duties up to $5000, $3600 and $3000 a year. Duties include many branches of physics, chemistry, engineering and technology, electricity, metrology, metallurgy, engineering, etc.

Assistant Statistician (Public Health)—Applications will be received until June 8th. To fill vacancies in the U. S. Public Health Service, for duty in Washington, D. C. and in the field. Entrance salary is $2400 with possible advancement in pay without change in assignment up to $3000 a year. Duties are to plan and carry out minor statistical investigations involving the use of technical statistical methods and a general knowledge of the epidemiology and the etiology of the more common diseases of man.

Engineering Aid, Senior Engineering Aid—June 12th is the closing date for applications for these positions. To fill vacancy in the position of engineering aid in the Bureau of Public Roads, for duty at Arlington, Va.; vacancy in the position of senior engineering aid in the Office of Civil Engineer, Coast Guard, Washington, D. C.; and vacancies occurring in positions requiring similar qualifications. Entrance salaries are $1680 and $1860 per annum, respectively, with advancement in pay without change in assignment up to $2040 and $2400 a year. Duties consist of the calculation and classification of land areas and related work as required.

Mathematician—Applications will be received until June 22nd for the above position. To fill vacancy at Aberdeen Proving Ground, Aberdeen, Maryland, and vacancies occurring in positions requiring similar qualifications throughout the U. S. Entrance salary of $4000 for Aberdeen Proving Ground position and $3800 a year for the Departmental Service, Washington, D. C. Advancement in pay without change in duties may be made up to $5000 a year. Duties are to originate, investigate, and supervise use of mathematical processes for ballistic computations; and research development covering ordnance materials and methods.

Chief Engineering Inspector-Superintendent, Senior Engineering Inspector-Foreman—Receipt of applications for these positions will close June 22nd. To fill vacancies in the Bureau of Public Roads, Department of Agriculture, for duty in the states of Washington, Oregon, Idaho, Montana, California, Nevada, Arizona, Utah, Wyoming, Colorado, New Mexico, and the territory of Alaska. Entrance salaries per annum are $2400 and $1860 respectively with advancement in pay without change in duties up to $3000 and $2400.

PERSONAL NOTES

Frank T. Sheets, chief state highway engineer of Illinois, on May 1st became associated in consulting capacity with the firm of Barker, Flavin, Sheets and Wallace, with offices at Burnham Building, Chicago.

John C. Brigham, formerly superintendent of public works of Mountain Lakes, N. J., has been appointed engineer-manager of Pleasantville, N. Y.

Mrs. Eva Cressy Pebworth, president of the Cressy Contracting Company, and also of the Cressy Road Sprayer Manufacturing Co. of Everett, Mass., died on April 2nd in her 38th year. For ten years since the death of her father, Walter Cressy, she had managed these two companies, her husband, Richard R. Pebworth, being manager of the plant of the Road Sprayer Manufacturing Company. Her company has held road building and road oiling contracts in Massachusetts, New Hampshire, Vermont, Connecticut, Maryland, Virginia and Texas.

Mrs. Minna N. Dennes, member of the engineering firm of L. Copleston, of Flushing, L. I., died on April 11th, aged 56. She had been with the company 22 years and was recognized as an expert in estimating construction costs.

Robert Hoffman, city engineer of Cleveland, Ohio, on April 13th received a medal from the Cleveland chamber of commerce for "public service."

W. R. Holway, recently chief engineer of the Spavinaw water project, Tulsa, Okla., has been retained by the Cuban government on a water supply project for Santiago, and expects to be in Cuba for several months to come.

Frank L. Weaver has been appointed city engineer of Wyandotte, Mich.

Nelson N. Fuller, formerly assistant health officer of Montclair, N. J., has been appointed sanitation engineer of Jacksonville, Florida.

John D. Stevenson, of Pittsburgh, Pa., formerly in the division of bridges of that city, has been appointed chief engineer of the newly established bureau of bridges and structures.

W. F. Reichardt has been appointed city engineer of Watertown, Wis.

G. R. Miles has resigned as city engineer of Olean, N. Y.

H. H. Kranz has been appointed superintendent of street maintenance and repair of the city of Cincinnati, Ohio.

Pure Chemicals

NIAGARA ALKALI CO. EBG

Back of these chemicals

To keep waterworks operations moving smoothly

WATERWORKS engineers know and value the remarkable effectiveness of Liquid Chlorine in water purification.

The makers of E B G Liquid Chlorine render a service in excess of supplying an absolutely pure product. The vital necessity of maintaining purification processes without interruption is fully appreciated—so E B G Liquid Chlorine containers are carefully cleaned and inspected before refilling. Also, E B G resources, of manufacturing and container equipment, are such that prompt shipments are made to meet your requirements.

Look for the RED Cylinder
—it is your protection

Send for your copy of "Liquid Chlorine in Water Sterilization and Sewage Disinfection."

This E B G Cylinder Valve Yoke permits of more rapid connection and disconnection of chlorine containers to other equipment by eliminating the necessity of making threaded connections each time a new cylinder is put in service.

For the convenence of our customers in addition to our plant and warehouse at Niagara Falls, we carry stocks at Providence; Long Island City; Charlotte, N. C.; Dallas, Tex.; Chicago and Denver.

Look for the RED Cylinder

Affiliated with
Niagara Alkali Company
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Sales Agents for CAUSTIC SODA *and* BLEACH

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PIONEER MANUFACTURERS of LIQUID CHLORINE

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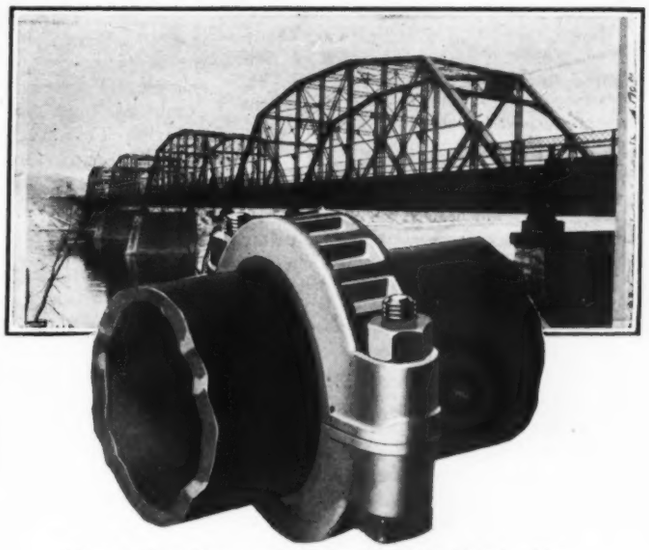

Victaulic Pipe Line over Willimansett Bridge, Holyoke, Mass.

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FLEXIBLE LEAKTITE PIPE JOINTS

PATENTED in U. S. and Foreign Countries

Victaulic Making New Friends in Every Field Where Pipe Is Used.

Steel, Wrought or Cast Iron Pipe. Invaluable Where Vibration or Settling Ground Is Encountered

6 GOOD REASONS
FOR USING
VICTAULIC PIPE JOINTS

1. Low cost of installation with unskilled labor.
2. Absolutely leakproof.
3. Flexible under pressure.
4. Acts as an expansion joint.
5. Saving in freight on pipe.
6. Interchangeable with all makes of pipe by use of our adapters.

Pipes with VICTAULIC JOINTS can be laid rapidly and, owing to the flexibility of the joints, can be laid on uneven or undulating ground; exact alignment is not necessary. This results in a great saving of time and labor.

ASK FOR OUR BULLETIN
AT THE WATERWORKS CONVENTION
BUFFALO, JUNE 7-11

Or Write to

VICTAULIC COMPANY OF AMERICA

26 Broadway **New York**

GLIDE ROAD MACHINERY COMPANY

The Gilde Road Machine Co., Memphis, Tenn., has moved into a new factory located at 2604 University Ave., S. E. Minneapolis, Minn., where the company will manufacture, in addition to its regular line of patrolmen graders for horses, a new motor patrol to be drawn by tractors.

FLORIDA MANAGER OF LINK-BELT CO.

The Link-Belt Co., Chicago, announces that Nelson Brandt has rejoined that company's sales force and will manage a new branch office to be opened up in Florida.

ECONOMICAL OPERATION OF G. M. C. TRUCKS

Official notification of first award for economical truck operation has been received by the General Motors Truck Company from the Russian government, it having been won by a G. M. C. heavy duty truck in a 3,300 mile test run conducted by Russian officials. The route was largely through desolate country, over long stretches of barren steppes and across the mountain ranges. Gasoline and oil were measured and every item of repair and maintenance was recorded. A trophy of chased siiver accompanied the notification.

CUTLER-HAMMER'S ATLANTA OFFICE

The Cutler-Hammer Mfg. Co., Milwaukee, Wis., has opened a new sales office in the Healey Building, Atlanta, Georgia. This office will take care of the trade in the states of North Carolina, South Carolina, the eastern section of Tennessee, Georgia, Florida, Southern Alabama, and Mississippi. A. C. Gibson, formerly of the Philadelphia office, is in charge.

The General Machinery Co. of Birmingham, Alabama, will continue to serve their trade in the southern half of Alabama.

DOUBLE DUTY PAVING TRUCK

The Wood Hydraulic Hoist and Body Co., Detroit, has furnished for the city of Detroit, Mich., a dump truck by means of which the city, instead of employing two trucks, one for carrying the paving materials and the second for carrying men and tools, combines both purposes in the one vehicle. This truck has an extra long chassis to provide sufficient space in the cab for men and tools and a compartment in the dump body for extra tools, etc. The paving material is carried in the truck body and is dumped in the ordinary way employed on dump trucks manufactured by this company.

WOOD HYDRAULIC HOIST AND BODY USED BY DETROIT FOR EMERGENCY STREET REPAIRS.

VICE-PRESIDENT OF UNIVERSAL PORTLAND CEMENT CO.

Blaine S. Smith, who started as salesman with the Universal Portland Cement Co. in 1908, has advanced through various positions and at the last meeting of the board of directors was elected vice-president of the company. Mr. Smith is president of the Portland Cement Association.

FILM SHOWING STEEL WELDING

A film has been prepared for the Lincoln Electric Company of Cleveland, Ohio, showing the use of welding in the construction of the building of the Peerless Auto Sales Company, Canton, Ohio, the first all-welded building in the country. Technical societies, engineering schools, chambers of commerce and the like can obtain the film for exhibition without charge except express costs. Arrangements for its use can be made with the J. B. Abell Organization, 637 Union Trust Building, Cleveland, Ohio.

CLIMAX REPRESENTATIVE

The Tulley Equipment Company, St. Louis, Mo., representative of the Climax Engineering Co. of Clinton, Ia., has moved to a new location at 2339 Pine St.

BLOCK ASPHALT PRODUCTS CORPORATION

This corporation, located at St. Petersburg, Fla., has under construction at Tampa, and expects to complete by May 30, an asphalt block manufacturng plant which will have the largest output of any in the South. It will use Uvalde rock asphalt for manufacturing blocks. The block type of pavement is used extensively throughout Florida, hence the locating of such a plant in that state. In addition to handling asphalt blocks, the company will also market Uvalde asphalt for sheet and repair work.

MANAGER OF WOOD HYDRAULIC HOIST COMPANY

The Wood Hydraulic Hoist and Body Company, Detroit, Mich., has appointed Frank H. Dewey as general manager. Mr. Dewey was formerly associated with the United States Navy as designer, after which he was connected with the Packard Motor Car Co., the Horizontal Hydraulic Hoist Company, and in 1920 with the Wood Co.

WESTINGHOUSE STREET LIGHTING ENGINEER

A. L. Gottsche, of the street lighting section of the Westinghouse Electric & Manufacturing Company, South Bend, Indiana, has been promoted to the position of street lighting engineer and assigned to the Tampa office. He has been with the company for the four years since his graduation from the Mississippi A. &. M. College.

NEW MODELS REPUBLIC TRUCKS

The Republic Motor Truck Co., Alma, Mich., announces several new changes in design and construction of its trucks, one being the standardization of design and construction through an entire line from the 1¼ ton "rapid transit" to the five-ton model 35. This includes a new two-ton truck with a heavier frame and other improvements.

LINDLEY-DUNNING MANUFACTURING CO.

A new company with the above name has been incorporated with an office at 5120 Wakefield St., Germantown, Philadelphia, where it will manufacture pumps and equipment for electric refrigeration. Elmer D. Dunning, formerly vice president and general manager of the Dunning Compressor Company of Philadelphia, manufacturers of air compressors, has given up active duty in that company and is devoting all his time to electric refrigeration pumps.

PARADON ENGINEERING COMPANY

The southwestern district office of the Paradon Engineering Company, formerly located at Tulsa, Oklahoma, has been moved to 209 Local Building, Oklahoma City. Lawrence K. Cecil remains in charge of the office, assisted by E. P. Thomas.

The company has recently installed for the water department at Buffalo, N. Y., a new type of chlorinator, the Ashokan, for handling large capacities of chlorine, originally developed for the Catskill water supply, of New York City.

WESTINGHOUSE COMPANY SALES MANAGER

The Westinghouse Company announces that J. McA. Duncan, for fourteen years Pittsburgh manager, has been promoted to assistant general sales manager. He will be succeeded by W. R. Marshall, formerly branch manager of Buffalo. Mr. Duncan has been in the company's employ for forty years.

NEWS OF THE SOCIETIES

July 14-16—AMERICAN SOCIETY OF CIVIL ENGINEERS. Summer meeting at Seattle, Wash.

Aug. 3-5—UNION OF CANADIAN MUNICIPALITIES. Annual meeting at London, Ont.

Aug. 23-25—NORTH CAROLINA SECTION, AMERICAN WATER WORKS ASSOCIATION. Sixth annual meeting at Asheville, N. C.

Aug. 31-Sept. 2—LEAGUE OF THIRD CLASS CITIES OF PENNSYLVANIA. Annual convention at Hazelton, Pa.

Sept. 6-13—INTERNATIONAL ROAL CONGRESS. Fifth congress to meet at Milan, Italy.

Sept. 13-14—INTERNATIONAL CONFERENCE ON HOUSING AND TOWN PLANNING. To be held at Vienna, Austria.

Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.

Sept. 21-23—INTERNATIONAL CITY MANAGERS ASSOCIATION. Annual convention at Colorado Springs, Colo.

Sept. 21-24—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Ashville, N. C.

Sept. 28-Oct. 1—AMERICAN SOCIETY OF SANITARY ENGINEERING. Annual meeting at Washington, D. C.

Oct. 4-8—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Oct. 11-14—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting at Buffalo, N. Y.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

BOSTON AFFILIATED TECHNICAL SOCIETIES

The Council of the Affiliated Technical Societies of Boston held its fourth annual meeting on June 7th. There are now eleven member societies; the Boston Post of the Society of American Military Engineers and the Massachusetts Highway Association having joined the original nine during 1925. The total membership on May 31st of this year was 3,987. The outstanding feature of the year was the two-day meeting on fuel and power held last December.

The following officers were elected for the ensuing year. Chairman, Frederic A. Eustis; vice-chairmen, Lewis E. Moore and Frank A. Marston; treasurer, Alfred Kellogg, clerk, Edwin H. Rogers; additional members of the executive committee, Frederick M. Gibson and Maurice M. Osborne.

MASSACHUSETTS HIGHWAY ASSOCIATION

The Massachusetts Highway Association held its second New England Open Air Road Machinery Show on May 13th and 14th on the Parkway, Cambridge. About fifty concerns exhibited equipment and representatives attended from all the New England States and many others, even west of the Mississippi. The regular quarterly meeting of the association was held on the evening of May 13th.

NEW ENGLAND WATERWORKS ASSOCIATION

The Research Sub-Committee of the American Committee on Electrolysis, which is making a study of the national electric code on grounding of electric circuits on water mains, has distributed a questionnaire covering data which it needs to complete the study of the experience of waterworks with electric ground wires and insulating or high-resistance joints.

AMERICAN ASSOCIATION OF ENGINEERS

The Annual Convention of this association was held in Philadelphia June 14th to 16th and more than 100 delegates and members attended, including one from Honolulu. The principal matters considered were questions of practice, registration and fees. The membership was reported to be about 6,500, about 1,000 of which are in the student grade. The members from a number of States expressed dissatisfaction with the working of the state licensing laws, especially the administration of those in Pennsylvania. The following officers were elected: C. J. Ullrich, president; W. R. Harris and D. M. Baker, vice-presidents; directors, J. M. Buswell, C. W. Cross, V. Cochrane, C. S. McKee, H. G. Culverhouse, E. G. Haines and J. Denison. The Annual Banquet was held on Wednesday evening and on Thursday members left for Atlantic City.

The Tucson Chapter. This chapter has elected for the ensuing year as president, E. D. Gardner; first vice-president, G. E. P. Smith; second vice-president, Jane H. Rider; treasurer, Mark Ehle; secretary, Walter P. Taylor; recording secretary, Chas. T. Vorhies; directors, Byron Cummings and H. B. Leonard.

Seattle Chapter. This chapter has elected as president, D. W. McMorris; first vice-president, J. W. Bowerman; second vice-president, J. M. Lowman; third vice-president, J. J. Cryderman; fourth vice-president, R. A. Davies; secretary-treasurer, W. T. Batcheller; asst. secretary-treasurer, L. J. Sisley.

AMERICAN INSTITUTE OF QUANTITY SURVEYORS

A society with the above name was organized in Chicago at a meeting held June 7th to 9th, attended by about 35 from all sections of the country. Those present considered chiefly building construction and relation with contractors, although other classes of construction were mentioned. A constitution was adopted and the following officers elected: President, W. F. Jackson; first vice-president, C. L. Weeks; second vice-president, Oscar Euphrat; secretary, C. T. Burman, and treasurer, G. Sjmak.

ENGINEERS CLUB OF BALTIMORE

This Club on June 3rd elected as president C. C. Cook and as vice-presidents, Norman A. Hill and J. U. Bragg. W. A. Wood was re-elected treasurer.

STATE SANITARY ENGINEERS

The State Sanitary Engineers held a conference at Buffalo, N. Y., June 5th to 7th, which was attended by representatives from more than 25 states and from the U. S. Public Health Service. Several committees made more or less detailed progress reports and seven topics were taken up in round table discussions, Commercial Septic Tanks and Chemical Closets; Placing Water and Sewer Mains and Connections in the Same Trench; Indexing Sanitary Engineering Literature; Use of Concrete Pipe for Small Sewers; Sewage Pollution at Bathing Beaches; Control of Summer Resort Developments; and, Interstate Milk Shipments. Officers chosen for the ensuing year: Chairman, C. A. Holmquist; vice-chairman, H. E. Miller; members of the executive committee, C. M. Baker and S. DeM Gage.

WESTERN SOCIETY OF ENGINEERS

The 56th annual meeting of this society on June 2nd was attended by nearly eight hundred. The principal features of the meeting were the conferring of honorary membership on Herbert C. Hoover, Ralph Modjeski and Samuel Insul; and, the conferring of the Washington Award on John W. Alvord. F. E. Morrow was elected president.

NATIONAL HIGHWAY TRAFFIC ASSOCIATION

The annual meeting of this association was held April 30th at the rooms of the Automobile Club of America in New York City. Among the papers presented were: "The Trend of Motor Vehicle Legislation," by Russell H. Huffman; "Synchronous Utilities of Highway Transport and Railroad Transportation," by George H. Pride; "Metropolitan Traffic Control," by Harold M. Lewis; "Economic Field and Future of the Rent-a-Car," by P. L. Emerson; "Organizations for Traffic Planning in Municipalities," by Prof. A. H. Blanchard; "High Cost of Bottle Necks on Highways," by G. E. Hamlin; "High Speed Highways Required for Economic Transportation," by Ernest P. Goodrich; "Illumination of Highways," by David Beecroft; "Aerial Photography as an Aid in Highway Traffic Surveys," by Chas. F. Keale; "Highway Safety Promoted by Adequate Brakes on Motor Busses and Trucks," by David C. Fenner.

PERSONAL NOTES

P. N. Daniels, formerly senior sanitary engineer of the New Jersey State Department of Health, has been appointed city sanitary engineer of Trenton, N. J.

L. Murray Grant, formerly city engineer of Spokane, has been appointed superintendent of the municipal water works of Seattle.

Robert W. Creuzbaur, formerly consulting engineer to the Borough of Brooklyn, New York, was killed by gun shot on June 2; aged 66 years.

Charles M. Upham has resigned as state highway engineer of North Carolina. At the request of the Mexican National Highway Commission he has been retained by it as general manager for reorganizing its engineering forces and the construction forces of the contractor.

Wm. Spann, formerly chief of surveys and plans with the Missouri State Highway Department, has been appointed city engineer of St. Joseph, Mo.

A. R. Schuh, formerly with the Wisconsin State Highway Commission, has been appointed city engineer of Waukesha, Wis.

NEW CATALOGS

GRATINGS AND TREADS

The Grating Co. of America, Pittsburgh, Pa. A 4-page folder describing "Tri-Lok" sidewalk gratings and treads.

BELT CONVEYORS

Stephens-Adamson Mfg. Co., Aurora, Ill. A 24 page bulletin describing belt conveyor equipment in a gravel screening plant and other uses.

GASOLINE POWER UNITS

Climax Engineering Company, Clinton, Iowa. Three new bulletins describing the application of Climax engines to various types of driven units.

QUARRYING MACHINERY

The Sullivan Machinery Company, Chicago, Ill. Three new bulletins describing rock drill tunnel carriages, portable electric hoists, and belt driven air compressors.

ROCK & GRAVEL CRUSHING EQUIPMENT

The Gruendler Patent Crusher & Pulverizer Co. St. Louis, Mo. An 18 page catalogue of crushers, screens, conveyors, ets.

SEWAGE EJECTOR

The Chicago Pump Co., Chicago, Ill. A 16 page catalogue of the "Flush-Kleen" sewage ejector.

TRACKSON FULL CRAWLERS

The Full Crawler Company, Milwaukee, Wisconsin. An 8 page bulletin giving details and specifications of machine and explaining adaptability to various purposes.

WELDING AND CUTTING APPARATUS

The Alexander Milburn Company, Baltimore, Md. Small 32 page catalogue of apparatus for acetylene gas cutting and welding.

HAND CRANES

Herbert Morris, Inc., Buffalo, N. Y. A 32 page catalogue of hand overhead cranes, with suggestions for installations.

FOOS DIESEL ENGINE

Foos Gas Engine Company, Springfield, Ohio. A 4 page folder describing a new high speed Diesel Engine.

ASPHALT BLOCK PRESS

The National Moulding Press Corp., New York City, N. Y. An 8 page pamphlet under the title "New Ways to Profit in Paving Contracting," describing press for manufacturing asphalt blocks.

SARGENT SNOW PLOWS

The Union Iron Works, Inc., Bangor, Me. A 32-page pamphlet showing views of Sargent plows at work from Maine to Minnesota.

GRAHAM TRUCKS

Graham Bros., Detroit. Sixty-page catalog entitled "Trucks for Public Utilities" describing, with specifications and illustrations, numerous types of trucks of this make.

GOOD ROADS MACHINERY

The Good Roads Machinery Co., Kennett Square, Pa. A 64-page catalog with the title "Everything for the Road Maker," describing materials and appliances of all kinds necessary or useful in road making and maintenance.

QUICK HARDENING CONCRETE

North American Cement Corporation, Hagerstown, Md. A treatise on the use of "Cal," discussing materials, mixing, production and numerous features of use and serviceability of this material.

PORTABLE STEEL DERRICKS

Taylor Portable Steel Derrick Co., Chicago, Ill. Describes a derrick constructed entirely of steel, used for handling material on buildings, in pipe yards, etc.

WHITE TRUCKS

The White Truck Co., Cleveland, Ohio. No. 70 of the "Albatross." A 24-page advocate of the use of White trucks for all purposes.

MULTI-STAGE CENTRIFUGAL PUMPS

Pennsylvania Pump and Compressor Co., Easton, Pa. A 16-page catalog of single suction, opposed impeller type centrifugal pumps.

CELITE FOR CONCRETE

Celite Products Co., Los Angeles, Cal. A bulletin giving directions for use of Celite as an admixture in concrete.

BUHL AIR COMPRESSORS

The Buhl Co., Chicago, Ill. Bulletin No. 101, describing in detail the Buhl type Y portable compressors in 115 and 160 ft. displacements.

ROUGHEN PAVING GAUGE

Roughen Adjustable Paving Gauge Co., Fond du Lac, Wis. Folder describing and illustrating a contrivance for gauging excavation, concrete base.

(*Continued on page 41*)

INDUSTRIAL NOTES

SULLIVAN MACHINERY COMPANY APPOINTMENT

The Sullivan Machinery Company, Chicago, Ill., announces the appointment of Charles B. Officer, formerly assistant to the president on engineering matters, to the position of chief engineer of the company in charge of engineering matters pertaining to new machinery or change in existing designs. Mr. Officer has been connected with the company since he graduated from Yale in 1925.

The company also announces that, beginning June 1st, the northwestern sales office will be situated at 120 South Lincoln Street, Spokane, Wash., instead of in the Hutton Building as heretofore. This provides larger quarters and the display room and warehouse will be together. Robert T. Banks is manager.

PNEUMATIC CONCRETE MIXER PATENT

The United States Circuit Court of Appeals on May 3rd affirmed a decision of the U. S. District Court on August 4th last in favor of the Concrete Mixing & Conveying Company of Chicago in its suit against the Ulen Contracting Corporation and the Shandaken Tunnel Corporation for infringement of what is known as the McMichael Patent. This patent, of which the Ransom Concrete Machinery Company is sole licensee, is for manufacturing mixers adapted to placing concrete pneumatically at a distance from the mixer, as in tunnels. In the original decree Judge Hand had said: "The appreciation by the inventor of the necessity of limiting the concrete to be conveyed to sections of moderate size and weight, and his method by the second air jet of securing the cutting off of a segment from the mass of concrete and a propulsion of this segment through the discharge pipe involves invention of a high order."

KALBFLEISCH CORPORATION PROMOTION

The Kalbfleisch Corporation, at the last meeting of the Board of Directors, promoted E. M. Dinkins, formerly sales manager of the Heavy Chemical Division, to be vice president; J. F. Fredriksson also vice president and W. H. Niehardt as assistant treasurer.

ARMCO CULVERT ANNIVERSARY

This year is the 30th anniversary of the invention of the corrugated culvert and is being celebrated by the Armco Culvert & Flume Manufacturers' Association and was initiated by exchange of telegrams between Walter H. O'Neall, president of the association, and George M. Verity, president of the American Rolling Mill Company. The company has on display the first corrugated culvert ever made, placed by its inventor, James H. Watson, under a public highway near Crawfordsville, Indiana. At that time these culverts were made in a small hand operated factory, while today the Armco culvert is manufactured in more than thirty thoroughly modern plants.

(*Continued from page* 40)

sand cushion, and surface of street pavements, with specifications and instructions for use.

HUBER MOTOR ROLLER

Huber Manufacturing Co., Marion, Ohio. A 24-page catalog describing in detail and illustrating the Huber 10 and 12-ton motor roller.

TRAVERS PROCESS

Travers Process Corporation, Columbus, Ohio. A circular describing process for purifying sewage, strawboard, canning and creamery wastes, etc.

OHIO CONCRETE MIXER

Ohio Concrete Machine Co., Columbus, Ohio. Eight-page folder describing the Ohio standard concrete mixer operated by Fordson tractors.

ZEOLITE WATER SOFTENER

The Graver Corporation, East Chicago, Indiana. Bulletin entitled "Graver Zeolite Water Softener" describing use of downflow method of softening with a natural zeolite, showing views of installations, and of the equipment.

HOMESTEAD VALVES

Homestead Valve Manufacturing Co., Homestead, Pa. Catalog of valves for use with water, air, steam, acids, oils, etc.; plug type valves, full round opening valves, protected seat globe, and other devices.

RUSSELL ROAD GRADERS

The Russell Grader Manufacturing Co., Minneapolis, Minn. Catalog of graders of numerous sizes and types for both tractor and animal power, profusely illustrated.

GALION BELT CONVEYORS

Galion Iron Works and Manufacturing Co., Galion, Ohio. Four-page folder describing, with illustrations, the Galion belt conveyor and appurtenances.

CAMERON CENTRIFUGAL PUMPS

Ingersoll-Rand Co., N.Y.C. Twenty-eight page catalog of single-stage, double-suction, volute centrifugal pumps, and 24-page catalog of multi-stage, turbine centrifugal pumps. With illustrations showing installations and structural parts. Also "Cameron Hydraulic Data," a 62-page handy reference book giving numerous hydraulic tables and other data.

DIRECT INJECTION OIL ENGINES

Ingersoll-Rand Co., N.Y.C. Technical data and details of the I. R. "PO" oil engines of 55, 110 and 150 B. h.p. sizes. Gives views of numerous installations and details of engine parts.

CATER WELLS

William H. Cater Co., Chicago, Ill. Catalog of Cater vulcanite well, Byron Jackson deep well turbine, well screens, etc.

PERFORATED IRON PIPE CULVERTS

Armco Culvert & Flume Manufacturers Association, Middletown, Ohio. Under the title "Increasing the Efficiency of Roadbed Drainage" a 16-page pamphlet describes the use of Armco perforated iron pipe for securing thorough drainage of road beds.

MOORE TRENCH MACHINES

Moore Trench Machine Co., Rockaway, N. J. A 28-page catalog describing the various types of Moore trench machines, used especially for laying pipes of all sizes.

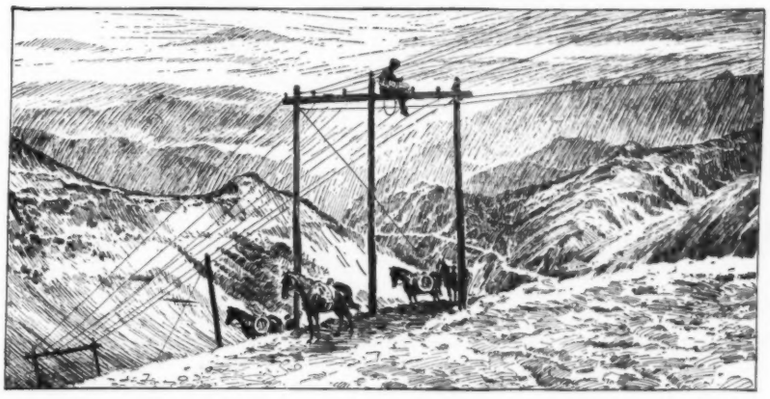
BAKER-MANEY SCRAPERS

Baker Manufacturing Co., Springfield, Ill. Under the title, "Road Officials and Baker-Maneys" a 16-page bulletin describes the advantages of these scrapers in road maintenance.

KOEHRING DANDIE MIXER

Koehring Company, Milwaukee, Wis. A 24-page catalog of a one-bag mixer.

Telephone line over the Rocky Mountains



The Builders of the Telephone

SPANNING the country, under rivers, across prairies and over mountain ranges, the telephone builders have carried the electric wires of their communication network. Half a century ago the nation's telephone plant was a few hundred feet of wire and two crude instruments. The only builder was Thomas A. Watson, Dr. Bell's assistant.

It was a small beginning, but the work then started will never cease. In 50 years many million miles of wire have been strung, many million telephones have been installed, and all over the country are buildings with switchboards and the complicated apparatus for connecting each telephone with any other. The telephone's builders have been many and their lives have been rich in romantic adventure and unselfish devotion to the service.

Telephone builders are still extending and rebuilding the telephone plant. A million dollars a day are being expended in the Bell System in construction work to provide for the nation's growing needs.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY AND ASSOCIATED COMPANIES

BELL SYSTEM

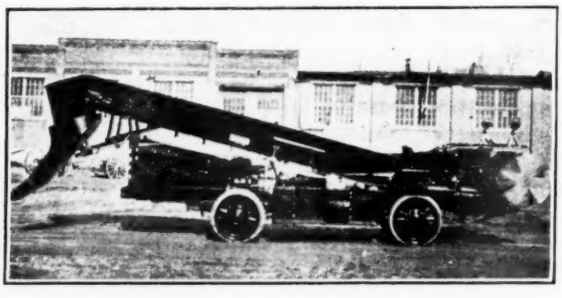
IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

FOX ROTARY SNOW LOADER

After two years of study and testing designs to perfect a machine that would load snow and ice from city streets, breaking it up and condensing it to half its volume, stand rough use, and travel at 12 to 15 miles an hour to and from the garage, the Fox Rotary Snow Broom Company has put on the market a machine which it claims will do double the amount of work of any snow machine now available and one which was built especially for handling snow and not primarily as a gravel and sand loader, although it can be used for loading such materials. Last winter it was demonstrated on a Pennsylvania highway to open up a road where the snow had been lying for 10 days or more and become thoroughly packed and frozen, and it opened a road through about 1,000 ft. of this material in less than 15 minutes



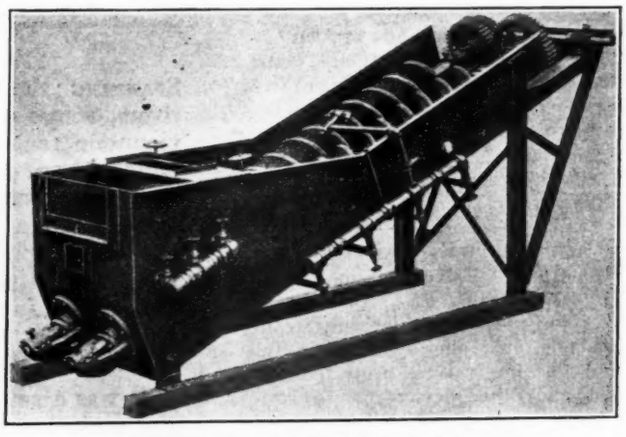
FOX SNOW LOADER LOWERED FOR TRANSIT

The escalator is 28 feet long, 30 inches wide and 18 inches deep and travels at the rate of 170 feet per minute. Front paddles, 30 inches in diameter, travel at the rate of 100 revolutions per minute clearing a swath 72 inches wide. Snow is delivered from the elevator to a chute which can be raised and lowered from the operator's seat and can load trucks at any angle on either side or the rear. The elevator can be raised or lowered in 30 seconds, the height overall with the elevator lowered being 9 feet 6 inches, while when it is raised the lower end of the chute is 9 feet 6 inches from the ground. Speed can be varied from 1 mile to 15 miles per hour. The machine is mounted on a standard chassis of about 3½-ton capacity propelled by a Buda 6-cylinder motor developing about 90 h.p. Hyatt roller bearings are used throughout.

THE PERFECT CLASSIFIER

The Perfect Classifier Co., Nashville, Tenn., manufactures a device for washing sand and gravel which is designed to take aggregates after they have passed over a screen and been divided into sand and coarse product, and give them a thorough scrubbing and scouring, delivering a practically dewatered product free of all impurities.

The separation made by the machine is based on the difference in specific gravity of materials and can be used for washing any material in which there is a difference of specific gravity between the recoverable product and the filth found with the deposit. The 48-inch size is designed to handle coarse gravel where the required capacity exceeds 100 cu. yds. an hour, and when operated at 50 r.p.m., which is about the proper speed under average conditions, will deliver 120 cu. yds. per hour There are two 18" screws, each used in breaking up the mass of material into smaller units and bring about a scrubbing action, which prepares it for the action of the water in removing the foreign material. This machine requires 300 to 500 gallons of water per minute at 30 to 40 pounds pressure. The machine requires a floor space of 5 feet by 18 feet and an overhead clearance of 9 feet. It delivers material at the same elevation at which it enters the machine.



A "PERFECT" CLASSIFIER, 48-IN. SIZE

A 36-inch twin sand machine uses four 14-inch screws, or can be obtained with a single pair of 14-inch screws. It is designed for sand or gravel up to ¾-inch. The single sand machine requires 10 h.p. and the twin model 20 h.p.

The Perfect Classifier is built of steel and iron throughout, electrically welded and the box is absolutely water tight. The supporting legs are made of 7-inch channels securely braced. The end thrust bearings are specially designed with machine finished packing glands to prevent leakage at the lower end of the screws.

THE TRACTOCRANE

Thaleg & Hock, Chicago, Ill., furnish a crane mounted on a truck, intended to fill the gap between hand loading and big crane work, and which can be moved rapidly from place to place. It is built around a standard Fordson power unit, with chassis of heavy steel construction with extra heavy wheels and engine set low, bringing the center of gravity near the ground. The mast, which swings a full 180°, is mounted on a machined turntable and revolves on tapered rollers. The standard boom is 20 feet long, of the latticed type, raised and lowered by a power driven worm and gear.

THE TRACTOCRANE

Where a fall block and hook are used a single drum of the positive type is needed; with a clam shell bucket two hoisting drums, one positive and the other automatic, are required; and on drag-line work, two positive drums.

The Tractocrane can be used for backfilling trenches, light drag scraper work, handling pipe, serving a road builder's railway, etc. It is one man operated and claimed to be ready at a moment's notice, moved quickly and easily, moderate priced and cheaply maintained. It has a travel speed of 1, 1½ and 4 miles per hour, hoist drum speed of 125 ft. per minute, hook speed of 60 ft. with a 2-part line, swing speed of four per minute.

FULLER AUXILIARY TRANSMISSION

Fuller & Sons Mfg. Co., Kalamazoo, Mich., manufacture an auxiliary transmission for use with a Ford one-ton truck, which it claims is simple in design and operation, easy to install, gives low gear ratios, positive shifting, no auxiliary brakes needed, low price, made of the best materials by an experienced company which fully guarantees it.

NEWS OF THE SOCIETIES

Aug. 3-5—UNION OF CANADIAN MUNICIPALITIES. Annual meeting at London, Ont.

Aug. 23-25—NORTH CAROLINA SECTION, AMERICAN WATER WORKS ASSOCIATION. Sixth annual meeting at Asheville, N. C.

Aug. 31-Sept. 2—LEAGUE OF THIRD CLASS CITIES OF PENNSYLVANIA. Annual convention at Hazelton, Pa.

Sept. 6-13—INTERNATIONAL ROAL CONGRESS. Fifth congress to meet at Milan, Italy.

Sept. 13-14—INTERNATIONAL CONFERENCE ON HOUSING AND TOWN PLANNING. To be held at Vienna, Austria.

Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.

Sept. 21-23—INTERNATIONAL CITY MANAGERS ASSOCIATION. Annual convention at Colorado Springs, Colo.

Sept. 21-24—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Ashville, N. C.

Sept. 28-Oct. 1—AMERICAN SOCIETY OF SANITARY ENGINEERING. Annual meeting at Washington, D. C.

Oct. 4-9—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Oct. 7-15 — ALL-WESTERN ROAD SHOW. Second exhibition at San Francisco, Cal.

Oct. 11-14—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting at Buffalo, N. Y.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

Nov. 8-12—AMERICAN ASSOCIATION OF STATE HIGHWAY OFFIALS. Annual meeting at Pinehurst, N. C.

Jan. 10-14 — AMERICAN ROAD BUILDERS ASSOCIATION. Annual convention and road show at Chicago, Ill.

AMERICAN SOCIETY OF CIVIL ENGINEERS

At the meeting of the Board of Direction of this society, July 12th and 13th, it approved of the studies being carried on by the Society for Promotion of Engineering Education on the subject of engineering education and voted to give it the society's financial support. It also authorized appropriation of funds needed immediately by the Stevenson Creek test dam investigation and for the committee of the A. S. C. E. which is studying the effect of earthquakes on engineering structures, to be used in studying the vibration periods of buildings.

The board has been asked to determine whether the ethics of the profession are violated by members who solicit from other engineers in public employ and subordinate to them, funds to be used for the defense of the governor of the state in a suit brought against him for wrongful use of public funds (undoubtedly referring to the case of Gov. Small of Illinois) and decided that "no such request could be presented from above, even though couched in terms to make contributions appear voluntary, without carrying with it an implied threat. The committee recommends therefore that all members of the profession who have thus been solicited ignore the request, and it takes this occasion to condemn such practices most emphatically. If it should happen that failure to respond to the request for contributions results in discharge or other unfair treatment of members of this society, then suitable action should be taken for redress, with assurance that this society will give such support as circumstances permit."

The board was also asked to consider a request for the expulsion of two members of the society who, as members of the board of public service of St. Louis, agreed to recommend the removal of E. E. Wall, director of public service, at a meeting at which he was not present; but the board voted that they be not expelled from membership in the society.

ENGINEERS SOCIETY OF CLEVELAND

The Engineers Society of Cleveland, Ohio, on June 14th elected as officers: President, Wendell P. Brown; vice president, J. V. Emmons, and treasurer, Dudley H. Scott. It elected to honorary life membership Willard Beahan, a retired consulting engineer of Cleveland Heights.

MICHIGAN ENGINEERING CONFERENCE

An organization known as the Michigan Engineering Conference has been formed by twenty-three societies and it is proposed to hold annual meetings, the next one to be February third and fourth in Detroit. L. E. Williams was appointed chairman and E. L. Brandt, secretary of the Detroit Engineering Society, as secretary.

ST. LOUIS ENGINEERS CLUB

This club at its annual meeting on June 15th elected the following officers: J. D. Robertson, president; W. W. Horner and A. S. Hawks, vice presidents; W. O. Pennell, treasurer, and C. W. Sammelman, secretary.

PROFESSIONAL ENGINEERS ASSOCIATION OF SOUTHEASTERN OREGON

An association of this name has been formed with 20 charter members and the following officers elected: President, Emmet G. Stack; vice-president, E. L. Vinton; secretary, D. L. Buckingham; treasurer, T. F. Maginnis.

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS

This society has elected for the ensuing year: James M. Welsch as president; R. J. Smyth and W. T. Husson, vice-presidents; T. Ebert, secretary; and, J. W. Osberg, treasurer.

PROVIDENCE ENGINEERING SOCIETY

The Providence Engineering Society, of Providence, R. I., on June 8 elected the following officers: President, Francis B. Marsh; vice president, R. Leslie Fletcher; secretary, A. W. Meyer; treasurer, C. T. Morey.

OHIO WATERWORKS ASSOCIATION

This association at its annual meeting July first and second elected the following officers: President, W. H. Sharp (re-elected); vice president, S. R. Case; and secretary-treasurer, W. H. Miller.

SAGINAW ENGINEERS' CLUB

This club was organized at Saginaw, Michigan, on June 29th, and the following directors elected: G. W. Francis, E. A. Kreuger, Z. E. Colby, H. D. Tubbs and E. H. Spencer.

UTAH SOCIETY OF ENGINEERS

This society at its annual meeting on June 10 elected the following officers: President, Murray Sullivan; vice presidents, J. A. Hale and Lloyd Garrison; secretary, R. R. Wooley and treasurer, R. K. Brown. The last two were re-elected.

IOWA ASSOCIATION OF ENGINEERS

This association at its annual meeting, June 16 and 17, elected the following officers: President, Frank J. Parks; vice president, W. A. Pike; secretary, Clyde A. Bland and treasurer, John Baumgartner.

PERSONAL NOTES

W. H. Van Winkle, president and manager of the Water Works Equipment Co., and for several years chairman of the Transportation Committee of the Water Works Manufacturers' Association, died July 16th, following an apoplectic stroke on July 7th, at Belgrade Lakes, Maine, where he had gone with Mrs. Van Winkle on a fishing trip.

Wilbur F. McClure, state engineer of California for fourteen years past, died suddenly on June 22 while on an inspection trip.

Thomas H. Messer of San Francisco, was recently appointed city manager of Coronado, California.

W. J. Jamieson has been appointed city engineer and superintendent of streets of Phoenix, Arizona.

W. K. Seitz, recently city engineer of Saint Joseph, Missouri, has been appointed city manager of Melbourne, Florida.

CIVIL SERVICE EXAMINATIONS

Transitman—Applications for this position will be received until August 7th. Entrance salary in General Land Office Service is $1,860 a year and subsistence while engaged on field work. Advancement may be made, without change in assignment up to $2,400 a year. Promotions are made after satisfactory service and in the discretion

(Continued on page 42)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

WOOD TRASH PUMPS

Fairbanks, Morse & Co. have obtained exclusive rights to manufacture and market Wood trash pumps—a type of pump first installed in 1917 for pumping New Orleans sewage, as described in "Municipal Journal" for September 21, 1918. A brief general description of the pump was given in that article, but as no detailed description was given, and as the above named company has recently begun to offer the pump for similar service elsewhere, we feel justified in describing it among "New Appliances."

In outward appearance this pump is similar to the ordinary side-suction, heavy-duty, clear-liquid centrifugal pump. But it uses a peculiar design of enclosed impeller, instead of the open impeller ordinarily used for pumping fluids carrying trash. The impeller has two blades with well-rounded edges at their entrance and well filleted where they meet the shrouds or sides; therefore a rag or other trash does not find sharp projections on which to catch and clog. Moreover, while passing through it does not come into contact with stationary side plates but is promptly discharged through one of the large ports into the pump case or volute. The tapering section of the impeller blade and its low discharge angle exert a powerful wedging action on the fluid which develops a strong coughing effect, which expells large solids of irregular shapes.

The pumps are of extremely rugged construction. The impeller is of very heavy proportions, usually of close-grained cast iron, and the water ways through it are so rounded as to form smooth contours. The pumps are made with the main shaft either horizontal or vertical. The bearings in the horizontal pumps are ball bearing and self-aligning sleeve bearing types—the former only for 3 in. to 12 in. pumps. The pumps are made in 3 in. to 20 in. sizes, with normal capacities of 200 to 10,000 gallons per minute.

SEWER PIPE JOINT MATERIAL

The Servicized Products Corporation, Chicago, Ill., has developed materials for use in jointing sewer pipe known as Sewer Pipe Belt Joint Packing, Felt Oakum, and Plastic Compound for cold application, and Filled Sewer Pipe Compound for hot pouring. The Plastic Compound when used with the belt joint packing provides a flexible, adhesive, non-porous waterproof joint allowing for settlement or deflection in the line of sewer without developing seepage through open joints or broken bells; this material being applied in the cold form as received from the factory. It can be applied with moisture present, either in the trench or on the interior of the pipe.

Felt Oakum is an asphalt fiber filled product which is highly resistive to acids and alkali. For those who prefer a hot poured joint the company furnishes the filled sewer pipe compound. These materials can be used with clay, vitrified or cement pipe.

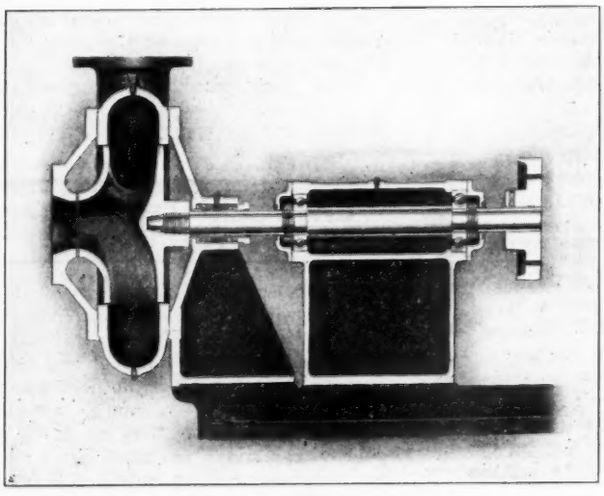
"FLUSH-KLEEN" SEWAGE EJECTOR

The Chicago Pump Company, Chicago, has recently developed what it has named the "Flush Kleen" Dry Basin Sewage Ejector, which does away with the old fashioned strainer basket. The object of the unique feature of this ejector is the elimination of manual cleaning of the ejector strainer basket. After trying several plans, the one adopted was the flow reversal principle, by which the filter or screen is cleaned by reversing the flow of water.

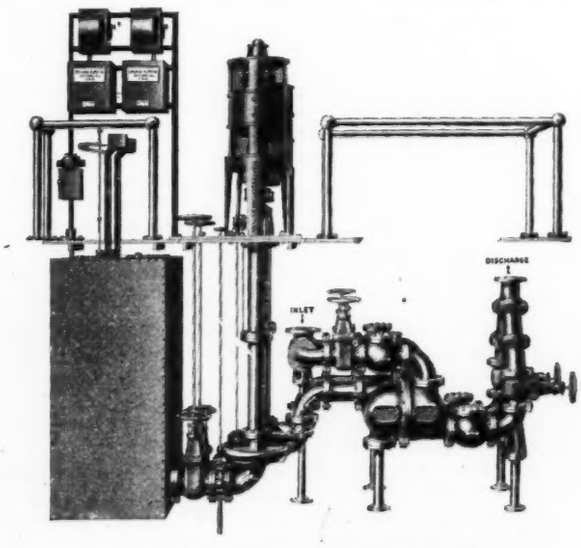
In this ejector the strainer itself consists of a cast-iron screen 18 inches in diameter and one inch mesh, enclosed in a special cast-iron housing. This strainer chamber is placed in the ejector pit between the inlet and the pump casing. This means that all sewage entering the wet basin must first pass through this strainer and then through the pump into the basin. When the water rises in the wet basin to a predetermined height the switch is closed and the pump starts to reverse the flow of water, pumping the water out of the wet basin through the strainer into the sewer, thus forcing into the sewer all solids and foreign matter which had collected on the screen. The water flows through the screen during this time with a velocity four or five times as great as when passing into the wet basin, thus insuring that foreign matter caught in the screen will be washed back into the sewer. These ejectors are made for pumping against heads of from ten feet to one hundred feet, discharging from one hundred to one thousand gallons per minute.

NOVO DIAPHRAGM PUMP

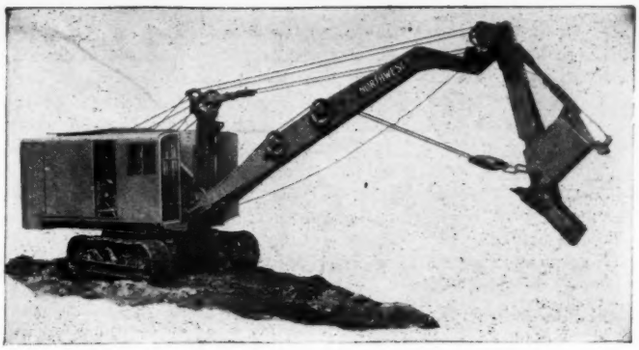
The Novo Engine Company, Lansing, Mich., the first of this year developed a new pump outfit which, while the pumps themselves are similar to those built for several years, has a power unit, speed reducing unit and live rubber diaphragm that differentiate it from any other. The power unit is a UF 3-6 H. P., two-cylinder, Timken tapered roller bearing engine, which utilizes an opposed throw counterbalanced crank shaft, enabling the engine to operate without vibration under all load conditions. To reduce the engine speed to a slow reciprocating motion an enclosed speed reducing unit with crank arm is employed. Gears, drive shaft pinion and speed reducer gear all run in oil. The maker claims that the diaphragm used in Novo pumps will operate one hundred and fifty to two hundred hours under normal conditions, which is said to be two or three times longer than ordinary diaphragms.



WOOD TRASH PUMP



FLUSH-KLEEN SEWAGE EJECTOR



NORTHWEST BOTTOM-DUMP PULL SHOVEL

BOTTOM-DUMP PULL SHOVEL

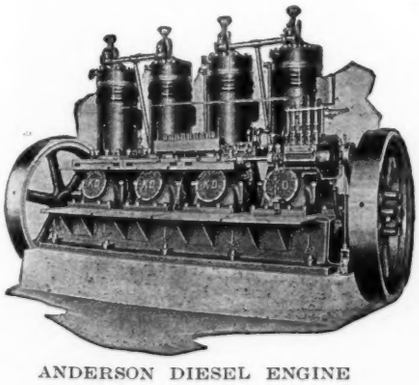
The Northwest Engineering Company, Chicago, has recently placed on the market a bottom-dump pull shovel which they especially recommend for deep ditching and which can be quickly converted to a dragline. The general principle of the machine is similar to that of the pull shovel first put on the market in 1923, but the new shovel is equipped with a bottom-dump bucket instead of the scoop type. The bucket is hinged back of the teeth, which allows the bottom to drop out when a bolt is pulled by the operator by means of a cord. When the bucket is returned to the ditch in the process of digging, it automatically closes on striking the bottom of the cut and the bolt holds it in place. Buckets are supplied 33 in. and 39 in. wide for Model 105 and 42 in. and 48 in. wide for Model 104. Twenty-two carloads of Northwest shovels, cranes and draglines were shipped to the Tampa, Florida office of the Company at one time.

ANDERSON DIESEL ENGINES

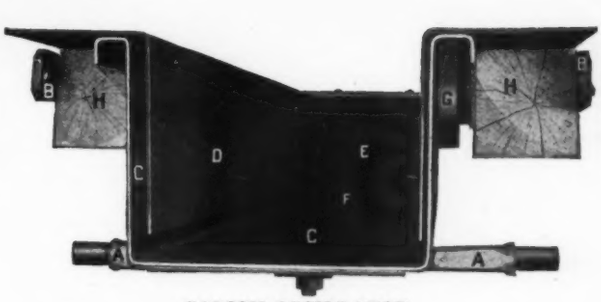
The Anderson Engine & Foundry Co., Anderson, Ind., after fifteen years' experience manufacturing Diesel engines, has recently developed the K D heavy duty type. It involves no new or untried principles, but developments of efficiency and economy. It is a two-stroke cycle, cold starting, mechanical injection, Diesel type. The governor arrangements and fuel injection are such that the speed may be changed at any time while the engine is in operation. Direction of rotation can be changed at will. All engines are conservatively rated for 1,000 feet altitude.

Engines are equipped with two fly-wheels of sufficient weight to insure steady operation. The power can be taken from either or both sides; through solid shaft, flexible, or friction cut-off coupling, or by belt from fly-wheel or pulley on either side of the engine.

The engines are started by means of compressed air admitted to the cylinders by automatic starter valves which are put into action by hand, the method being similar to starting an automobile. When ordered, an air starting outfit is furnished. K. D. engines are made from 50 to 360 rated horsepower.



ANDERSON DIESEL ENGINE



GALION OSCILLATOR

A—Drawbar to which moving arms are attached to operate the force feed.
B—Plates to which brace-rods connecting to conveyor are attached.
C—The oscillator part of the force feed mechanism. Note the double thick bottom.
D—Stationary sides of trough.
E—Sloping end of stationary part of trough.
F—Scraper which prevents material from going backward.
G—One of the eight self-lubricating wheels which support the oscillating section.
H—Solid oak ties which replace railway ties and support the force feed mechanism.

GALION OSCILLATOR

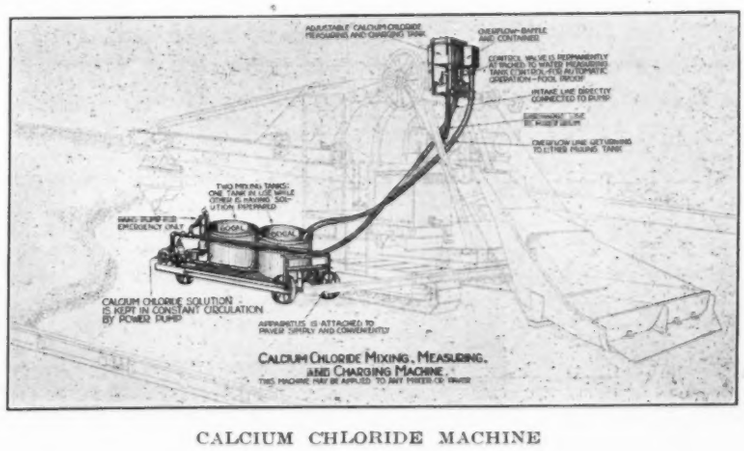
The Galion Iron Works & Mfg. Company, Galion, Ohio, manufactures a belt conveyor and for use in connection with it, an automatic force feed oscillator. In order to feed a belt conveyor from a railroad car, a shallow pit is dug along the track for a short distance to receive the bottom of the belt conveyor, and extended under the rails between a pair of ties to a depth of only six or eight inches below the bottom of the ties, the sides being supported by horizontal planks and stakes. What is known as the Force Feed Oscillator is set in this trench and feeds the broken stone or other material that is discharged from the bottom-dump hopper of the freight car on to the belt of the conveyor, thus relieving the belt of the friction and wear resulting when such material is dumped directly from the car on to the belt. The illustration and description explains the construction of the oscillator. When in use, the conveyor is firmly anchored by bars at both sides of the force feed mechanism, the moving part being operated by drive rods from the conveyor.

NEW CALCIUM CHLORIDE MACHINE

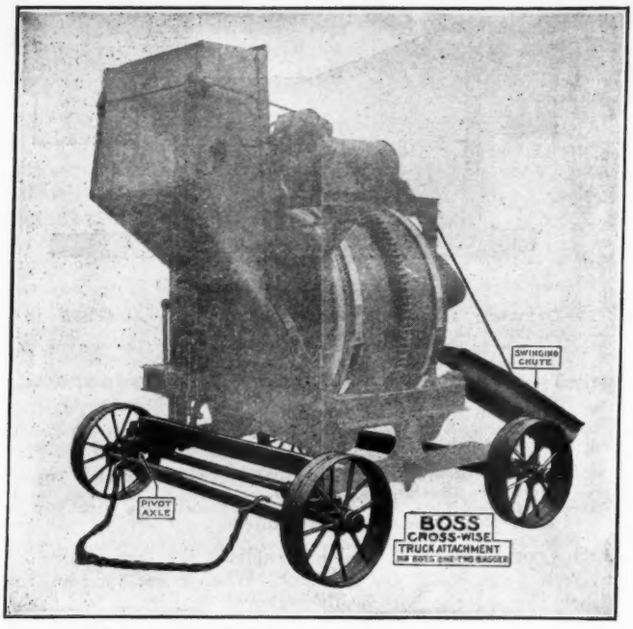
The Blaw-Knox Company, Pittsburgh, Pa., has recently placed on the market a new calcium chloride machine, designed to meet new specifications which have been issued in several States, which can inject a definite amount of calcium chloride into each batch of concrete. The company claims that automatic regulation and injection of the correct amount of calcium chloride solution is accomplished by this machine and that only one additional man is required to prepare the solution and handle the bags of calcium chloride. The machine is mounted on four wheels for easy transportation and is attached to the paving mixer so as to move with the work.

CROSSWISE TRUCKS FOR MIXERS

American Cement Machine Company, Keokuk, Iowa, manufactures a crosswise truck on which can be mounted its Boss Cement Mixer so as to transform a side discharge into an end discharge mixer. The illustration shows a 1-2 bag mixer mounted on a crosswise truck with a short swinging chute. This machine handles two



CALCIUM CHLORIDE MACHINE

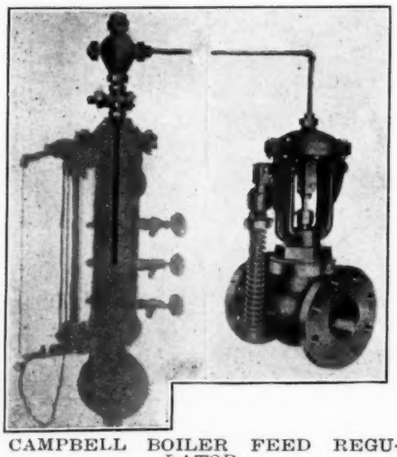


CROSS-WISE TRUCK FOR "BOSS" CONCRETE MIXER

sacks of 1-2-4 mix, with a daily capacity of over 100 cubic yards. By slipping the wheels off, special axles with spindles are slipped on the axles and wheels then put on the cross spindles, converting the mixer into an end-discharge machine. One of the axles has a pivot arrangement for turning corners when towing. The change from end discharge to side discharge can be made in ten minutes, the manufacturer claims.

BOILER FEED REGULATOR

The Atlas Valve Company, Newark, N. J., manufactures what it calls the "Campbell Boiler Feed Water Regulator" which, by utilizing a simple law of physics, maintains a constant water level when the load is steady; slows down the feed when a sudden increase in load develops, giving the boiler a chance to overtake the load before the regulator feeds more water; and speeds up the water input and quickly restores the water level when a sudden decrease in steam demand causes the water level to drop. There are no floats or thermostats to get out of order. The principle is that of delivering to the regulator, steam that contains more or less water, as the water in the boiler changes, thereby producing a pressure that varies in a definite and known relation to the amount of water contained in the steam entering the regulator, and then conveying this pressure as it varies to the diaphragm - operated control valve, thereby regulating the opening of the valve as the boiler demands more or less water.



CAMPBELL BOILER FEED REGULATOR

The regulator is a simple hollow casting with an inlet, outlet and a pressure port. It is connected to the boiler, preferably at the water column with the supply pipe to the inlet at the desired water level. The control valve can be installed at any point in the feed water line remote from the regulator. The regulator is made of either standard or extra heavy pattern, and in sizes from one half inch up to two inches in bronze, and from two and one half inches to four inches in cast iron.

INDUSTRIAL NOTES

ANDREWS-BRADSHAW CO.

L. F. Kuhman has been appointed vice-president and director of the Andrews-Bradshaw Co., Pittsburgh, Pa. He has been associated with the company for the past three and a half years and for eight years prior to that was sales engineer for the Ingersoll-Rand Co. in the Pittsburgh district.

JEFFREY MFG. CO.

The Jeffrey Mfg. Company, Columbus, Ohio, announces the election of Robert W. Gillispie as vice-president, assistant general manager and member of the board of directors. He has for many years been identified with the Bethlehem Steel Company, where he has obtained experience in both manufacturing and selling.

PORTLAND CEMENT SPECIFICATIONS

At its annual meeting on June 25th the American Society for Testing materials approved, subject to letter ballot, changes in Portland cement specifications recommended by its cement committee. The principal changes are an increase of twenty-five pounds in the tensile strength requirements of standard mortar briquets, or from 200 to 225 pounds per square inch for seven days, and from 300 to 325 pounds for twenty-eight days, and the elimination of the specific gravity test. The whole specifications and methods of test have been rewritten to conform in general to the phraseology used by the U. S. Federal Specification Board in its proposed Master Specifications. The new revision will become effective officially as soon as approved by letter ballot, probably about September 1st. At least one company, the Universal Portland Cement Company, announced that it would begin selling its cement in comformity with the new requirements on July 1st.

T. L. SMITH COMPANY

T. L. Smith Company, Milwaukee, Wisconsin, announces the appointment of the Arizona Tractor & Equipment Company of Phoenix as distributor for the state of Arizona; and the Howard-Cooper Corporation for the states of Oregon, Washington and the western half of Idaho.

JAMES McNEIL & BROTHER PERSONNEL

Thomas McNeil, Jr., president of the James McNeil & Bro. Co., announces the following changes in personnel of that company: Arthur Huehn has been elected general manager in place of C. V. Witt; A. E. Anderson has been elected treasurer, and H. K. Stevenson secretary. All of these have been with the company a long time.

CIVIL SERVICE EXAMINATIONS

(Continued from page 39)

of the Department, through the position of surveyor at salaries ranging from $2,400 to $3,000 a year, to the position of cadastral engineer at salaries ranging from $3,000 to $3,600 a year with subsistence.

Applicants must have had one season's experience as transitman on public-land surveys or in the re-establishment of old lines and sub-divisions; or two seasons' experience in a subordinate position in either class of work specified above; or three years of general surveying experience, the successful completion of each year of a civil-engineering course in a college or university being accepted as equivalent to not more than nine months of such experience.

Competitors will be rated on mathematics (algebra, geometry, and trigonometry); theory and practice of plane, topographic, and elementary geodetic surveying; public land surveying; adjustment and use of instruments; and training and experience.

Mechanical Laboratorian — August seventh is the closing date for receipt of applications for this position to fill vacancies at the U. S. Naval Academy, Annapolis, Md. Renumeration is $4.32 per day. Duties will include assisting in engineering laboratories, making repairs, conducting experimental work, etc.

NEWS OF THE SOCIETIES

Sept. 6-13—INTERNATIONAL ROAD CONGRESS. Fifth congress to meet at Milan, Italy.

Sept. 13-14—INTERNATIONAL CONFERENCE ON HOUSING AND TOWN PLANNING. To be held at Vienna, Austria.

Sept. 14-17 — NEW ENGLAND WATER WORKS ASSOCIATION. 45th annual convention at Providence, R. I.

Sept. 21-23—INTERNATIONAL CITY MANAGERS ASSOCIATION. Annual convention at Colorado Springs, Colo.

Sept. 21-24—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Ashville, N. C.

Sept. 28-Oct. 1—AMERICAN SOCIETY OF SANITARY ENGINEERING. Annual meeting at Washington, D. C.

Oct. 4-9—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Oct. 7-15 — ALL-WESTERN ROAD SHOW. Second exhibition at San Francisco, Cal.

Oct. 11-14—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting at Buffalo, N. Y.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

Nov. 8-12—AMERICAN ASSOCIATION OF STATE HIGHWAY OFFIALS. Annual meeting at Pinehurst, N. C.

Nov. 8-12—ASPHALT ASSOCIATION. Fifth annual asphalt paving conference at Mayflower Hotel, Washington, D. C.

Dec. 2-3 — HIGHWAY RESEARCH BOARD, NATIONAL RESEARCH COUNCIL. Sixth Annual meeting at Washington, D. C.

Jan. 10-14 — AMERICAN ROAD BUILDERS ASSOCIATION. Annual convention and road show at Chicago, Ill.

NEW ENGLAND WATER WORKS ASSOCIATION

The forty-fifth annual convention of this association will be held Sept. 14 to 17 inclusive at Providence, R. I., with headquarters at the Providence Biltmore. Technical meetings will be held in the ballroom on the fifteenth floor; exhibit in the foyer adjacent to ballroom. Secretary's office will be in elevator lobby on the fifteenth floor.

The following is the tentative program:

Tuesday, September 14

10.30 A. M. It is hoped to have addresses of welcome by the Governor or Lieutenant Governor, the Mayor of Providence, President of the Chamber of Commerce and perhaps others.
President's Address.
12 M. Meeting of the Executive Committee.
2.30 to 5.30 P. M. Technical program.
7 to 8 P. M. Technical program.
9 P. M. Informal reception with dancing at the Biltmore Hotel.

Wednesday, September 15

9 A. M. to 12 M. Technical papers.
2 to 6 P. M. Automobile trip to Builders Iron Foundry, General Fire Extinguisher Co., Gorham Co., Providence Parks, Brown University, R. I. School of Design, etc. Parties may be made up to visit such points of interest as guests may desire to see.
8 P. M. to 10.45 P. M. Technical program. It is expected that there will be a theatre party for the ladies on this evening.

Thursday, September 16

9 A. M. to 11.30 A. M. Technical program.
1 P. M. Inspection trip to the new Providence water supply to be followed by a Rhode Island Clambake and informal dance. The party will leave the Biltmore Hotel promptly at 1 P. M. by automobile and will return to the hotel probably at about 11.30 P. M.

Friday, September 17

9 A. M. to 12 M. Technical program.
2 to 4 P. M. Technical program.

Final information as to papers had not been received at the time of going to press, but the following have been promised:

PAPERS IN REFERENCE TO PROVIDENCE WATER SUPPLY

"Scituate Dam and Dike" by Francis B. Marsh, Designing Engineer.
"Real Estate and Damage Settlements for 15,000 Acres Acquired for Scituate Reservoir" by Earl C. Craig, Asst. Designing Engineer.
"Scituate Tunnel" by Richard R. Bradbury, Resident Engineer.
"Scituate Acqueduct in Open Cut" by Thomas T. Allard, Resident Engineer.
"Clearing and Grubbing 6 Square Miles for the Scituate Reservoir" by William A. Reid, Resident Engineer.
"Some Details of Grouting and Preparing Foundation for Scituate Dam" by James V. Turner, Resident Engineer.
"General Description of the Purification Works" by Walter W. Kittredge, Asst. Engineer.
"Some Color Observations on Waters Tributary to the Scituate Reservoir" by Frederick O. Clapp, Asst. Engineer.
"The Pumping Stations of the Providence Water Works" by James A. McKenna, Engineer, Water Department.
"The Methods of Treatment of the Providence Water Supply" by Julius W. Bugbee, City Chemist.
"The Method of Reading Meters, Billing and Collecting Revenue of Providence Water Department" by Albeus P. Murry, Chief Clerk.
"Water Main Distribution and Maintenance of Providence Water Works" by S. Frank Nolan, Superintendent of Water Distribution.

OTHER PAPERS

"Some Factors Affecting the Loss of Head in Rapid Sand Filters" by R. G. Tyler, Professor of Sanitary Engineering, Mass. Institute of Technology, in conjunction with Major W. A. Danielson and Mr. Maurice Le Bosquet, Jr., Graduate Students.
"Principles of Rate Making" by William M. Wherry, Counsellor at Law, New York, N. Y.
"Compensation for Stream Diversion for Municipal and Other Supplies" by Caleb Mills Saville, Manager and Chief Engineer Hartford, Conn. Water Works.
"Laws and Regulations for the Protection of Public Water Supplies" by Warren J. Scott, Director Bureau of Sanitary Engineering, Connecticut State Department of Health.
"Observations Abroad of Interest to Water Works Men" by Charles W. Sherman, Consulting Engineer of Metcalf & Eddy, Boston, Mass.
"The Theory and Use of Thermit Heat Units for Relieving Ice Troubles" by Dr. Howard T. Barnes, Professor of Physics, McGill University, Montreal, Canada.
"The East Providence Water Company" by A. C. Dickerman, Supt.
"Evaporation" by Robert E. Horton, Hydraulic Engineer, Voorheesville, N. Y.
"Chlorine Studies and Some Observations on Taste Producing Substances in Water, and the Factors Involved in Treatment by the Super and De-chlorination Method" by Norman J. Howard, Bacteriologist in charge of Water Purification, and Rudolph E. Thompson, Assistant Chemist, Filteration Plant Laboratory, Centre Island, Toronto, Ontario, Canada.
"Making Pipe Centrifugally in a Refractory Mold" by E. W. Herrmann, American Cast Iron Pipe Co. Illustrated with motion pictures.
"Linings and Coverings for Water Pipes" by Benjamin Talbot, Middlesbrough, England.
"Some Recent Applications of the Venturi Principle" by F. N. Connet, Builders Iron Foundry.
"The Cook System of Tube Well" by Cornelius O'Brien, A. S. Cook, Inc. Illustrated with motion pictures.
"Mechanically Cleaned Sedimentation Basins for Water Works" by Edmund B. Besselievre, The Dorr Co., Inc.
"Mechanical Ditch Digging" by Earle F. Lamprey, Barber-Greene Company.
"Some Phases of Chlorination" by William J. Orchard, Wallace and Tiernan Co., Inc.
Report of Committee on Standard System of Sanitary Scoring of Water Supplies.
Discussion on topics of interest to Superintendents.

ENTERTAINMENT

Tuesday evening, Sept. 14th, informal Reception and Dance at the Providence-Biltmore, Courtesy of the Water Works Manufacturers' Association.

Wednesday afternoon, Sept. 15th, Automobile trip to Builders Iron Foundry, General Fire Extinguisher Co., Gorham Co., Brown University, R. I. School of Design, Providence Parks, etc. Parties may be made up to visit such points of interest as guests may desire.

Wednesday evening, Theatre Party for the ladies, courtesy of the Water Works Manufacturers' Association.

Thursday, Sept. 16th, at promptly one P. M. automobiles will take the entire party for an inspection trip over the new Providence Water Supply. The party is due at Chopmist Hill Inn, Scituate, at about 6 P. M., where the Water Works Manufacturers' Association will provide one of Rhode Island's famous Clambakes. After the bake the party will remain as guests of the Water Works Manufacturers' Association for an evening of entertainment and dancing. Return will be made to Providence about 11:30 P. M.

The golf committee has arranged for golfing privileges for those who desire to play.

EXHIBITS

The following members of the Water Works Manufacturers Association have applied for exhibit space at the convention:

Union Water Meter Company, 31 Hermon St., Worcester, Mass.; R. D. Wood & Company, 400 Chestnut St., Philadelphia, Pa.; United States Cast Iron Pipe & Foundry Co., Burlington, N. J.; George A. Caldwell Company, Boston 26, Mass.; The A. P. Smith Manufacturing Co., East Orange, N. J.; The Federal Meter Corporation, 275 N. Arlington Ave., East Orange, N. J.; Public Works, 243 West 39th St., New York City; Paradon Engineering Co., 24 South Washington Pl., Long Island City; The Pitometer Company, 50 Church St., New York City; The Kennedy Valve Manufacturing Co., Elmira, N. Y.; Hydraulic Development Co., 192 Boylston St., Boston, Mass.; The Central Foundry Co., 41 East 42nd St., New York City; The American City, 443 Fourth Ave., New York City; Pittsburgh Meter Co., Wilkinson Branch P. O. Pittsburgh, Pa.; Bingham & Taylor, W. P. Taylor Co., successor, 208 S. Ellicott Square, Buffalo, N. Y.; Lead Lined Iron Pipe Co., Wakefield, Mass.; Ross Valve Manufacturing Co., Inc., Troy, New York; Wallace & Tiernan Co., Inc., Newark, N. J.; Water Works Equipment Co., 50 Church St., New York City; Cement Lined Pipe Co., 591 Washington St., Lynn, Mass.; Hersey Manufacturing Co., South Boston, Mass.; Red Head Manufacturing Co., 287 Atlantic Ave., Boston, Mass.; McWane Cast Iron Pipe Co., Birmingham, Alabama; Lock Joint Pipe Co npany, Ampere, New Jersey; Waterworks (Eng. & Cont. Pub. Co.), 608 S. Dearborn St., Chicago, Ill.; Eddy Valve Co., Waterford, N. Y.; Water Works Engineering, 225 West 39th St., New York City; Norwood Engineering Co., Florence, Mass.; Mueller Co., Inc., Decatur, Ill.; Neptune Meter Company, 50 East 42nd St., New York City; Thompson Meter Company, 50 East 42nd St., New York City; Engineering News-Record, Tenth Ave., at 36th St., New York City; George H. Snell, Attleboro, Mass.; National Tube Company, Frick Building, Pittsburgh, Pa., Chapman Valve Manufacturing Co., Indian Orchard, Mass.; Edson Manufacturing Company, 375 Broadway, Boston, Mass.; National Water Main Cleaning Co., 50 Church St., New York City; Rensselaer Valve Co., Troy, N. Y.

AMERICAN WATERWORKS ASSOCIATION

The Central States Section will hold a local meeting Sept. 21st and 22nd at Cleveland, Ohio, and Pres. Ellms has plans well under way for the program and entertainment. This section includes waterworks superintendents in the States of Ohio, Pennsylvania, Michigan and West Virginia. A booster committee has been appointed for each of these states and also a local

committee on entertainment. The registration headquarters and the first day's meeting will be held at the rooms of Cleveland Engineering Society on the 4th floor of Carnegie Hall. The second day lunch will be provided at the Baldwin Filter plant.

The California section will hold a section meeting October 28th to 30th, at San Diego, California.

The Iowa section will hold a section meeting November 3rd to 5th, at St. Louis, Mo.

SOUTHWEST WATERWORKS ASSOCIATION

The annual convention of this association will be held at Washington Hotel, Shreveport, La., on October 11th to 15th. Special effort is being made to have an excellent exhibit on the mezzanine floor of the hotel, where booths will be provided 8 ft. by 8 ft.

AMERICAN ROAD BUILDERS ASSOCIATION

In connection with calling attention to the annual road show and convention of the association in Chicago on January 10th to 15th, an urgent request has been made that schools, fraternal organizations, business associations, highway and government departments and the public in general join in observing the week of January 10th as "Good Roads Week."

A feature of the 1927 meeting will be a day to be known as international day, devoted to highway problems of Latin-American countries.

ASSOCIATED GENERAL CONTRACTORS

The executive board, advisory board, president's council and secretaries' council of the A. G. C. will be held at Kansas City, October 4th to 8th. An innovation will be the holding, on the second day, of separate sessions for consideration of problems particularly connected with highway construction.

SECOND ALL-WESTERN ROAD SHOW

On October 7 to 15 there will be held at San Fransico an exhibition of road construction equipment and materials similar to that which proved so successful last year. The show will be under the auspices of the Western Construction Equipment Distributors, which association contains members from eleven states. Conventions of contracting, state and county official, engineering, rock producing and good roads organizations of the Pacific Coast and Rocky Mountain states will meet at the same time and place. The show will occupy nearly a million square feet of space on the marina of the Panama-Pacific International Exposition, where last year's show was held.

Orders for space already received are said to assure that this year's show will exceed last year's in size. The U. S. Bureau of Public Roads has announced that the largest exhibit used by the Bureau will be displayed.

The general committee for the 1926 All-Western Road Show comprises T. W. Harron, president, San Francisco; Edward R. Bacon, vice-president, San Francisco; L. E. Murphy, treasurer, San Francisco; P. H. Curtis, Los Angeles, executive secretary; C. C. Chamberlin, A. E. Mason, C. A. Garfield, O. R. Peterson, Carl Kratz, F. C. Edmonds, W. E. Hewitt, S. S. Smith, E. S. Jenison, W. H. Mason, J. P. Sherbesman, and Stanley Kulp, San Francisco; Frank Gaines and Claude Faw, Berkeley, J. T. Alm and Charles A. Spears, Oakland; Dan R. Brown, Ed Crowley, George Monfort, L. M. Railsback and L. H. Garlinghouse, Los Angeles; F. C. Stannard, Salt Lake City; R. L. Balzer, W. E. Feenaughty and F. A. Kingston, Portland; F. C. Schoen and L. A. Snow, Seattle; and L. L. Clinton, Denver.

A hotels-housing committee will be organized to assure adequate accommodations to those attending the road show, or participating in one or more of the numerous conventions, national and regional meetings, and conferences scheduled from Oct. 7 to 15.

General headquarters have been established by the Committee for the 1926 All-Western Road Show at 625 Market St., San Francisco, under the direction of P. H. Curtis, executive secretary.

HIGHWAY RESEARCH BOARD

Preliminary plans are now under way for the Sixth Annual Meeting of the Highway Research Board, National Research Council, which will be held in the National Academy of Sciences-National Research Council building, at Washington, D. C., on December 2 and 3, 1926.

Meetings of the Research Committees will be held between Sept. 1 and Sept. 15, either at the National Research Council in Washington or at other points selected by the chairmen as being most convenient for the membership of their committees.

Reports and papers to be presented at the Annual Meeting will then be submitted to the office of the Highway Research Board, *in full and by summary*, not later than Oct. 1. These will be submitted to those selected to discuss them and returned not later than Nov. 1.

FIFTH INTERNATIONAL ROAD CONGRESS

At the Fifth International Road Congress, which opens at Milan, Italy, on September 6, the United States will be represented for the first time by official delegates. Acceptance of membership in the Permanent Association of International Road Congresses and authorization for the appropriation of expenses of delegates to the current meeting was provided by Congress during the closing days of the last session in Senate Joint Resolution 62, which was signed by the President on on June 18.

Acting on the joint recommendation of the Secretaries of State, Agriculture, and Commerce, the President has appointed as official delegates to the Congress: Thomas H. MacDonald, Paul E. Sargent, John N. Mackall, H. H. Rice, Pyke Johnson, H. C. MacLean, and H. H .Kelly.

The delegation will sail from New York on the Steamship President Harding, leaving August 25, and will arrive at Milan in time to take part in all meetings of the Congress which will be opened on September 6 and continue at Milan for six days, closing in Rome on the following day, September 13.

Simultaneously with the congress an international road exhibition will be held, under the patronage of the Communal and Provincial Administrations and the Chamber of Commerce of Milan in the Fiera Campionaria. The exhibition will open on the 1st and continue until the 20th of September.

(*Continued on page 48*)

CIVIL SERVICE EXAMINATIONS

City Planner. Applications for this position will be received until September 7th. To fill vacancy under National Capital Park and Planning Commission, Washington, D. C., at an entrance salary of $3,800 which may be advanced without change in assignment up to $5,000 a year. Duties consist in taking charge of a group of employees engaged in the preparation of plans and recommendations relating to traffic and transportation plants and subdivisions; highways, parks and parkways, drainage, sewerage and water supply, bridges, and other elements of city and regional planning.

Associate Instrument Engineer. Applications for this position will be received until September 28th, to fill a vacancy in the Air Service at Dayton, Ohio, and vacancies in the Bureau of Standards at Washington, D. C. Entrance salary in Washington is $3,000, with a possible advance in pay without change in grade up to $3,600 a year. The duties are to design and develop new aeronautical instruments, to improve those being used, to make calculations relative to construction and operation of those designed by others, etc. Will include work on instruments for both lighter-than-air and heavier-than-air craft.

Assistant to Chief Plant Engineer. Applications will be received until September 28th, to fill a vacancy in the Quartermaster Corps, Philippine Islands. Salary, $2,700 to $3,000. Duties, the operation and maintenance of a large central power plant consisting of steam plant, refrigeration plant and electrical plant, the last providing current for lighting and for operating a street car system; to design and superintend the installation of changes in or extensions of equipment, and to take the place of the Chief Engineer when he is absent.

NEW CATALOGS

CONCRETE MIXER

Standard Power & Equipment Co., Birmingham, Ala. An 8 page folder describing the Ohio-Standard one bag and half-bag concrete mixers.

WIRE ROPE

Broderick & Bascom Rope Co., St. Louis, Mo. A 40 page catalogue of "Yellow Strand" wire rope, for all purposes.

The American Cable Company, Chicago, Ill. An 88 page handbook on wire rope with instructions for measuring, handling, installing and maintaining such rope.

LIME IN CONCRETE

The National Lime Ass'n., Washington, D. C. A 16 page bulletin entitled "Putting Quality into Concrete Products," describing the use of lime in making concrete blocks and other products.

BITULUMIN

Hill, Hubbell & Company, San Francisco. A 30-page book describing, by the question and answer method, the nature and advantages of bitulumin paints for water tanks, stand pipes and other steel work.

SULLIVAN PORTABLE HOISTS

The Sullivan Machinery Company, Chicago. Sixteen pages of illustrations showing applications of "Turbinair" steam and electric portable hoists.

AIR LIFT PUMPING

Sullivan Machinery Company, Chicago, Ill. A 48-page bulletin, No. 71 I, describing methods and equipment for air lift pumping. Profusely illustrated.

DURIRON LITERATURE

The Duriron Co., Dayton, Ohio. File of bulletins describing use of Duriron for filtration plants handling alum solution; use for pipes, valves, pumps, and any metal with which alum comes in contact. Duriron is described as the most acid-resistant metal.

WATER SOFTENERS

International Filter Co., Chicago, Ill. A 20-page pamphlet describing "Crystalite" as the super-rapid Zeolite; to be used for softening water for municipalities or industries.

CEMENT LINED PIPE

Cement Lined Pipe Co., Lynn, Mass. A 20-page pamphlet outlining the development of cement lining for water pipes, giving cost, methods of manufacture and use, etc.

DIESEL ENGINES

The Foos Gas Engine Company, Springfield, Ohio. A 4-page pamphlet describing the Foos Type "L" Diesel engine, made from 50 to 475 horse power.

SLUICE GATES

Coffin Valve Co., Neponset, Mass. An 84-page catalogue on sluice gates of various types and sizes. Gives standard dimensions, weights and details, costs, etc.

AUTOMATIC PUMPING

Barret, Haentjens & Co., Hazleton, Pa. A 24-page booklet describing devices and methods; from a paper before the American Institute of Electrical Engineers.

FLEXIBLE TREAD CRANES

Orton Crane & Shovel Co., Chicago, Illinois. A 20-page bulletin describing models "T" and "E" gasoline, steam and electric cranes, with numerous photographs of uses.

TRAFFIC SIGNALS

Tokheim Oil Tank & Pump Co., Fort Wayne, Ind. A 12-page pamphlet describing traffic control signals for all kinds of traffic conditions.

The Telephone and the Farm

THERE was not a farmer in the world fifty years ago who could talk even to his nearest neighbor by telephone. Not one who could telephone to the doctor in case of sickness or accident. Not one who could telephone for the weather report or call the city for the latest quotations on his crops. Not one who could sell what he raised or buy what he needed by telephone. A neighborly chat over the wire was an impossibility for the farmer's wife or children.

In this country the telephone has transformed the life of the farm.

It has banished the loneliness which in the past so discouraged the rural population and drove many from the large and solitary areas of farms and ranches.

It is a farm hand who stays on the job and is ready to work twenty-four hours every day.

The telephone has become the farmer's watchman in times of emergency.

It outruns the fastest forest or prairie fires and warns of their approach. It has saved rural communities from untold loss of lives and property by giving ample notice of devastating floods. Three million telephones are now in service on the farms, ranches and plantations of the United States.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

COMBINATION AIR COMPRESSOR AND WELDER

Schramm, Inc., West Chester, Pa., has placed on the market a combination air compressor and arc welder driven by a gas engine and mounted on a single base. The outfit consists of a Buda gasoline engine, a Schramm compressor and a General Electric welding outfit. The complete equipment may be mounted on a standard two-ton truck or can be made portable by adding steel or rubber tired wheels.

The engine is a twenty-four horsepower, 800 r.p.m. unit which may be started and operated independently of either compressor or welding generator. The compressor is a two-cylinder, water-cooled machine with a capacity of 120 cubic feet per minute, equipped with an automatic unloading device; the air receiver being 16 inches in diameter by 42 inches high. The welding equipment consists of a belt-driven WD—12 arc welder with an idler pulley for belt tightening. By use of a Borg & Beck 12-inch clutch coupling, either machine may be connected with the engine.

The air compressor may be used for operating drills, grinders, chipping hammers, etc., and also in preparing work for welding; while with the welder light and heavy guage steel as well as cast iron can be welded. After the welding has been completed the compressor is used for grinding or chipping the weld. The outfit is 3 feet 10 inches high on a structural steel base 8 feet 4 inches long by 5 feet 11 inches wide. The total net weight is 4,000 pounds.

JEFFREY PORTABLE CONVEYOR

The Jeffrey Manufacturing Co., Columbus, Ohio, has recently put on the market a portable belt conveyor for handling sand, gravel, crushed stone, brick, etc. The special idea in mind was to provide a machine for handling materials discharged from hopper-bottom railroad cars and for reclaiming from storage piles. There are four important new features:

1. Steel side boards which are bent to extend under the side of the belt, forming with the belt a moving trough which provides larger capacity and prevents lumps from rolling off. 2. An improved type of carrying idler to support the loaded portion of the belt. 3. The extended and flared loading leg at the bottom, edged with belting material to form a seal with the moving belt. The flared hopper also centers the load on the conveyor. 4 An efficient gate at the foot of the conveyor to prevent material from falling into the enclosed boot housing.

The conveyors are built in 18, 24, and 30-foot lengths and furnished with either electric motor or gasoline engine. They can readily be adjusted to any convenient height; the foot of the conveyor is low so that it will readily enter a pile of loose material; the belt is 16-inch, rubber covered, troughed, and the idlers form a belt cleaning device; a loading leg bunches up material in the center of the belt to avoid spilling; steel flights are attached to center of belt to increase carrying capacity.

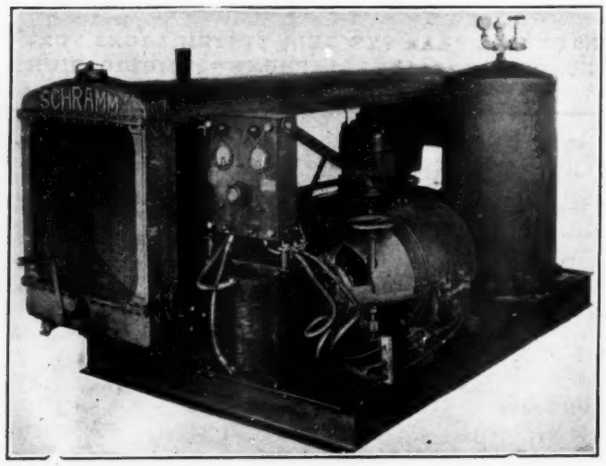
JEFFREY PORTABLE CONVEYOR

BAKER FORDSON BACKFILLER

The Baker Steel & Machinery Company, Omaha, Neb., manufactures a light boom-type backfiller which is attached to a Fordson tractor and is operated entirely by one man from the driver's seat of the tractor. It can be attached to the Fordson in about two hours without drilling any holes or interfering with the use of the tractor for other purposes. The manufacturer claims that an experienced operator will easily handle from forty to seventy-five cubic yards of material per hour, depending on conditions and kind of soil. The boom is telescopic, constructed of tubular steel and is adjustable from twelve to twenty-two feet in length, or longer if desired. Power is taken from the standard Fordson jack-shaft. The operating levers are located one on each side of the steering wheel of the tractor, within easy reach of the operator. The bucket is ruggedly constructed and provided with renewable plow steel cutting edge. The backfiller may also be used for lowering water, gas and sewer pipe into trenches, the backfiller boom being used as a crane. A direct pull of thirty-five hundred pounds can be obtained with the in-haul cable.

NON-CORROSIVE PIPE LINING

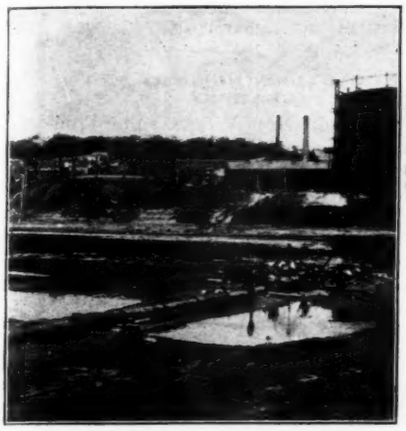
The Talbot Non-corrosive Linings Company, Philadelphia, Pa., is introducing in this country the Talbot hydro-carbon process of lining pipes which has for some years been used in Great Britain and, to a certain extent, in other countries. The process consists essentially in treating certain bitumens so that, when mixed with a suitable filler and applied to the pipe by centrifugal action, there results a tough, elastic lining having a smooth and mirrorlike surface which entirely protects the metal from corrosion. Generally a lining a quarter of an inch



COMBINED PORTABLE ARC WELDER AND AIR COMPRESSOR

BAKER BACKFILLER FILLING SEWER TRENCH

Make the First Cost Final



WHERE the original construction work is difficult, it usually follows that subsequent maintenance work will be excessively expensive.

Mains laid under water, in running sand, beneath railway tracks or in much traveled roadways, should be made of pipe that will reduce maintenance work and repair to a a minimum.

The first cost should be the final one for many years to come.

Bell & Spigot Joint Cast Iron Pipe is most frequently specified for such extraordinary important service.

Because of adaptability of the Bell & Spigot Joint, and the high resistance to corrosion, Cast Iron Pipe Mains require little maintenance work.

Because of the relatively short lengths, the many standard fittings and the Bell & Spigot Joint, Cast Iron Pipe lends itself admirably to construction under unusual conditions.

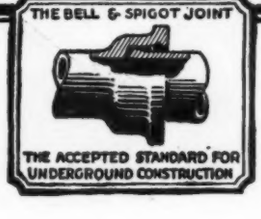
The tight joint, that is at the same time flexible, permits of many useful and unusual methods in building mains with Cast Iron Pipe.

Some cases showing the possibilities of the use of Cast Iron Pipe are shown on this page. We will gladly furnish information on its use under many other conditions.

Address: RESEARCH ENGINEER
CAST IRON PIPE PUBLICITY BUREAU, PEOPLES GAS BUILDING, CHICAGO

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request



Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

thick is recommended for ordinary purposes.

A specially treated bitumen is melted and intimately mixed with a selected filler which is generally a hard, siliceous material practically inert to all chemical action. Introduced into the pipe, centrifugal action spreads it evenly over the surface and gives a densely packed lining. It is claimed that the very smooth surface gives no opportunity for the adhesion of growths or deposits. Also that up to thirty-three per cent. concentration of nitric, sulphuric, acetic or hydrochloric acid has no effect upon this material; nor has saturated solutions of caustic potash, caustic soda, ammonia, chlorinated water or salt. The same material is used for covering the outside of pipe applied under pressure. In tapping a pipe so treated for house connections, a perfect thread is obtained in the lining as well as in the pipe itself. The weight of a quarter-inch lining varies from 2½ pounds per foot in three-inch pipe to 25 pounds in thirty-inch pipe, and 61 pounds in seventy-two inch pipe.

GRECO PAVEMENT RESURFACER

The Good Roads Equipment Corporation, Philadelphia, Penn., maufactures what it calls a "Greco Pavement Superheater" to be used in resurfacing and repairing asphalt pavements. By means of this appliance the surface is heated with a blast of hot air, softening the asphalt surface so that it can be scraped off to a depth of an inch or so. When it is desired to surface an old brick, granite or other hard pavement with an asphaltic surface, the old pavement can be heated first so as to insure a good bond between it and the new asphalt surface. The machine now offered is a development from the Greco Giant superheater, designed under the supervision of G. H. Lutz. Heretofore machines of this type have been leased to cities on a yardage basis but the smaller machines are now for sale and are recommended to cities for all repair work on pavements of asphaltic types.

CEMENT LINED PIPE

The Cement Lined Pipe Co., Lynn, Mass., has developed and patented certain details in connection with lining water pipe with cement, including black and galvanized pipe from ¾ inch to 4 inches diameter. Among the special features is lipped linings for fittings, which is made by forming on the inner circumference of a lining of either lead or tin, a lip of appreciable length so placed that it will come inside the burr made by the pipe cutter; which lip extends into the pipe and covers the small portion of iron exposed by the slight breaking back of the cement and makes a tight contact with the cement lining of the pipe. This protects the threads of the fitting and also the end face of the iron pipe, making it impossible for the water to come in contact with iron or steel at any point; to insure which the end of the cement lining is smoothed with a reamer so that the lip will ride evenly on to the cement. The soft metal does not injure the cement lining but makes a water tight contact with it. The company furnishes valves, stops and brass union couplings with the same special lining for connecting with cement lined pipe. To these products the company has given the name "Lipco."

RUSSELL MOTOR PATROL

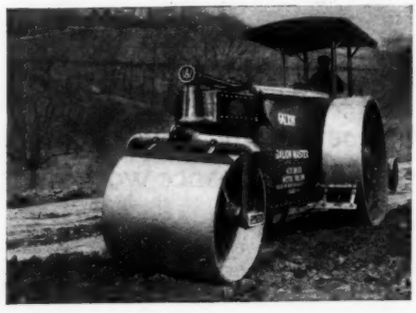
The Russell Grader Manufacturing Co., Minneapolis, Minn., manufactures a motor patrol grader for one-man operation using the 10-20 McCormick-Deering tractor and equipped with a cab. It has dual rubber tired rear wheels, an independently adjustable scarifier completely controlled from the operator's platform, and a 52" circle which gives a wide, rigid support to the blade, with a snug fitting, sure, durable lock. The machine-cut gears are completely enclosed, the bushings and collars for the worm shaft are of bronze, there is a take-up bearing in the forward lifting arm bracket, extra large ball and socket connections in the lifting links, and machined worm-gear steering control, giving an easy and steady control for road work. It has Alemite lubricating throughout, Timken bearings on the front wheels, a positive lateral shift of the blade adjustable from the operator's platform, and a side cranking device.

The machine is so built and the load distributed that a pressure of 4,200 lbs. is brought upon the blade. The blade is reversible and may be tilted forward or backward from a levelling to a cutting position. Both the blade and the cutting edge are made of high carbon steel.

The power is furnished by the 10-20 McCormick-Deering tractor with forward speeds of 2, 4 and 10 miles per hour, and reverse speeds of 3 and 8 miles per hour. The low speed may be used for heavy grading or scarifying where an unusual amount of power is required. The intermediate 4 mile speed is best adapted for maintenance work. On high, the patrol may be transported at the rate of 10 to 15 miles per hour. An experienced operator can use the reverse speed by working forward and backward to fill washouts, holes or ruts, or repair short stretches of bar road.

NEW GALION ROLLERS AND GRADERS

The Galion Iron Works and Manufacturing Co., Galion, Ohio, announces a new line of rollers and graders built about the McCormick-Deering industrial tractor. There are three distinct machines—the International Roller, the International E Z grader and the International standard grader; the former having rear control and the latter center control.

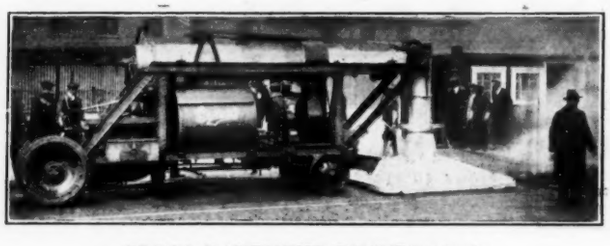


GALION ROLLER AND GRADER

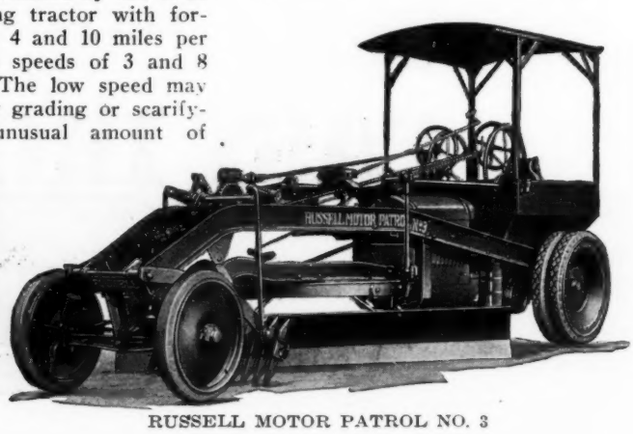
The roller is made in 5, 6, 7 and 8-ton sizes. Gearing from the tractor axles to the rear rolls increases the power of the tractor 50 to 60 per cent. The rollers have as regular equipment a nine-tooth scarifier and a fully adjustable planer placed under the roller.

The E Z lift grader may have blade and mould board 8, 10, 12 or 14 ft. in length if desired. The rear wheels may be rubber tired, with Galion rollers, or crawlers may be supplied as preferred; the roller wheels permitting rolling the road, while the crawlers give extra traction for heavy work.

The International grader is similar to the E Z lift in nearly every respect except that it has open lift gearing instead of one operating in a bath of



GRECO PAVEMENT RESURFACER



RUSSELL MOTOR PATROL NO. 3

Tape used on 2300 volt oil circuit breaker used on the primary side of the transformer in the picture.

Friction Tape that Minimizes Leakage

Pinholes in friction tape cause current leakage with subsequent short circuits. Laboratory tests of Firestone Friction Tape show 1.9 pinholes, instead of 6 pinholes, to every 3 yards, as permitted in the specifications of the American Society for Testing Materials, the bureau that determines uniformity of products.

Such a minimum of pinholes indicates first, firm-woven cotton sheeting; second, the use of superior compound that readily lends itself to calendering, and third, good frictioning. When Firestone Friction Tape is unrolled, the rubber stock does not pull off.

Order this dependable friction tape now—so you can supply local electrical contractors and manufacturers. Prices, specifications, etc., may be had from nearest branch or direct from Akron.

The Mark of Quality

Firestone
FRICTION TAPE

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . Harvey S. Firestone

oil in a gear case, as has the E Z lift, and the operator's position is near the central part of the machine.

TWIN BACKFILLERS

The Waterman Corporation, Detroit, Mich., furnishes to contractors what it calls the Twin Backfiller, with a view to substituting machinery for labor in back filling and provide at low cost an appliance that can be used for other purposes also. This back filler is applied to a Fordson tractor without interfering with any other work that the tractor may be called upon to do. Two spools are mounted with a double clutch on the right side of the Fordson, power being transmitted by a power take-off and worm and wheel reduction. The two spools provide for pulling in one cable, while another is being paid out; or both can be pulled in together if desired.

The Fordson travels parallel with the trench under its own power and operates two scrapers, each handled by one man. A clutch controlled by a hand lever throws one spool into gear and pulls its load toward the tractor, while the other cable is released to get into position. Thus one scraper is always working and no time is lost in returning the scraper to position.

Among the advantages claimed are that it can be attached to a standard Fordson in three hours without special tools; is small and compact, being entirely out of the way when not in use; and can work on the sidewalk if necessary; will pull any weight that the men at the scrapers can handle; needs only three men, including the operator; works around poles and trees in close quarters; scrapes dirt off lawns and walks; will fill 200 feet of trench an hour. The scrapers can be operated at almost any angle from the tractor. Each spool has a capacity of 120 feet of 3/8" cable, which can be used for other purposes, such as hoisting, as well as for hauling back fillers.

INTERFLASH HIGHWAY SIGNALS

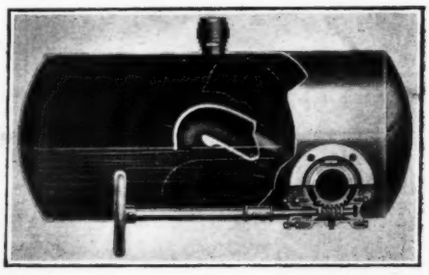
The Interflash Signal Corporation, New York City, manufactures highway signals which in color, shape, dimensions and indications are built in entire conformity with the standards adopted and approved by the recent Hoover Conference on Street Highway Safety. The signal is designed for both day and night service, all parts of words and symbols being illuminated at night by a flashing light.

The pedestal of the signal is constructed of Armco Ingot iron enameled white and set in a black enameled frame. The base is 47½" by 32½" and the focal height from base to center of sign is 85". The flashing signals are made of brass and aluminum painted Federal yellow with the words and symbols of glass. These flash yellow or red at night. The flashing mechanism and operating parts are of the standard Interflash type similar to that furnished by this Corporation to the U. S. Lighthouse Service. They consist of flasher, patented thermosiphon, gauge, regulator and Prest-o-lite acetylene tank. The flasher consists of an air tight, non-corrosive pot unacted upon by acetylene gas or acetone, within which is placed the flashing mechanism with valve seats of non-corrosive metal, covered by a flexible diaphragm securely held in place and protected by a cover. To the center of the diaphragm are secured the parts that operate the mechanism within the pot through the slight rising and fall of the gas pressure acting upon the diaphragm.

The light periods may be varied from one-tenth of a second as a minimum to two seconds with a 1/16 cu. ft. burner to 0.75 second with a ½ cu. ft. burner. The burner, located above the flasher, has attached to it a small pilot burner with an independent device to regulate the size of its flame. A thermosiphon is secured to the burner stand with a glass cylinder between top and bottom to protect the burner flame and pilot burners. The pressure reducing device is capable of reducing in one operation tank gas pressure (250 lbs) to any pressure that may be required for the flasher.

WATER SUPPLY FOR KOEHRING MIXERS

The Koehring Company, Milwaukee, claims to have developed a system of unequalled efficiency for supplying water to the mixing drum of its concrete mixer. Its claim is based on the belief that correct timing of the admittance of water into the drum and accurate measurement of the amount increase the strength of the resulting concrete.

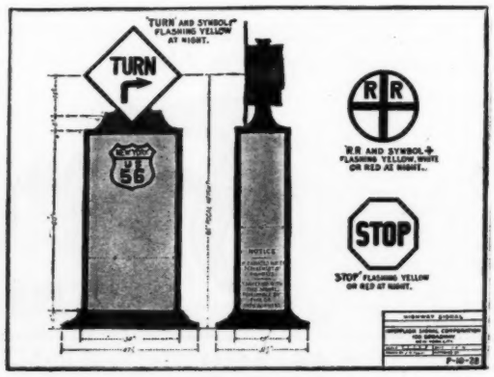


WATER TANK USED IN KOEHRING MIXER

The illustration shows the water tank of the mixer, in which is a measuring arm, which arm is raised or lowered by means of the hand wheel shown. The tank is filled with water at the beginning of a discharge and empties itself to the level of the opening of the measuring arm, the position of the latter thus determining the volume discharged. As the charging skip rises it automatically opens the three-way valve which starts the discharge of water, springs causing the valve to open completely and quickly. This is timed so that the water will enter the mixing drum just before the concrete materials, washing from the blades and buckets any accumulation from the previous batch, the water continuing to flow until all the concrete material is in the drum. This not only relieves the operator of this duty, but times the admission of the water more correctly than he would be likely to.

It is evident that the location of the opening of the measuring arm determines the discharge from the tank, and this remains practically constant whether the mixer is on a level road or one with a grade, since this opening is at the volumetric center of the tank. The measuring arm is self locking in any position, and can be padlocked in any position desired. It is claimed that the design is such that all flow of water to the mixing drum will stop abruptly and there will be no dribble

TWIN BACKFILLER WITH COVER REMOVED, SHOWING METHOD OF MOUNTING SPOOLS AND SHEAVES

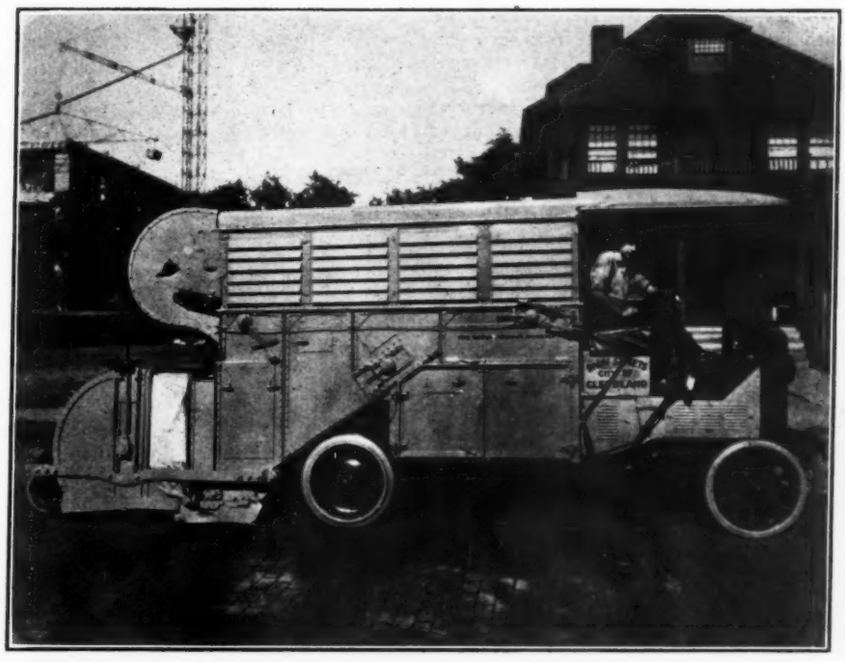

TURN AND SYMBOL FLASHING YELLOW AT NIGHT.
TURN
R R
R R AND SYMBOL FLASHING YELLOW, WHITE OR RED AT NIGHT.
STOP
STOP FLASHING YELLOW OR RED AT NIGHT.

INTERFLASH SIGNAL

Cleveland—Ohio

adopts

Butler Vacuum Street Sweeper



The Butler gets the fine dust as well as the heavy debris—something no other device will do. It will save its cost in a few months operation. Sweeps the gutte without separate attachment. Does not use water.

DUSTLESS ECONOMICAL SANITARY

Investigate—Write

The BUTLER MANUFACTURING CO.

MECHANICAL SWEEPING DEVICES

General Office and Plant 1810 E. 24th Street, Cleveland, Ohio

DISTRIBUTORS:

New York City
Pittsburgh
Dallas, Texas
Houston, Texas
Chicago
St. Louis, Mo.
Charlotte, N. C.
Atlanta, Ga.
San Francisco
Los Angeles, Cal.
Philadelphia
Birmingham, Ala.

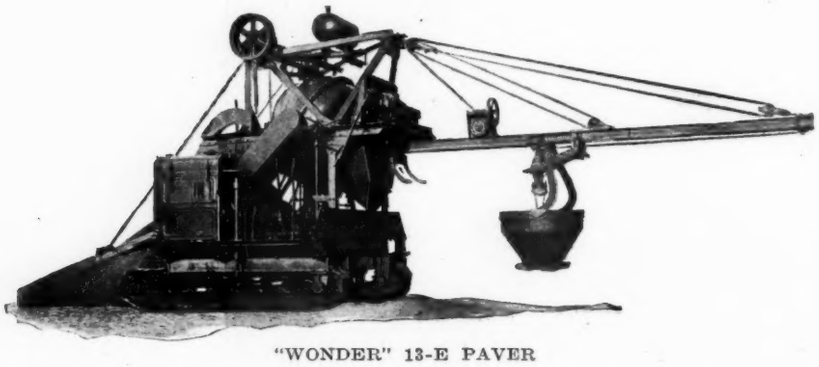
or intermittent flow at the end of the discharge.

All valve parts in contact with water are made of non-corroding materials such as bronze, brass, rubber or leather. The entire valve is a self-contained unit which can be removed for inspection by removing four bolts only.

WONDER 13-E PAVER

The Construction Machinery Company, Waterloo, Iowa, manufacturer of Wonder Mixers, have recently announced a 13-E Paver. This paver contains all of the necessary features of a standard paver with light weight and lower initial cost.

The power plant is a 30 H.P., 4-cylinder engine. The mixing drum is discharged by a power tilt which automatically stops the mixing drum in both the charging and discharging position. The operating levers are grouped for one man control. The distributing bucket is designed to discharge at any place on the boom, and the open end charging skip provides for truck charging.



"WONDER" 13-E PAVER

This paver is furnished with either full creeper-tread traction or four road wheels; and with boom and bucket or distributing chute.

CRYSTALITE

The International Filter Company, Chicago, Ill., manufactures a form of zeolite which it calls Crystalite, for which it claims special advantages. The grains in crystalite are much larger than those of greensand (another product of this company) and are sharp cornered and irregular in shape. These factors lessen the tendency of the grains to pack together and thus to increase the pressure losses in the water forced through it. This makes possible higher softening rates than are possible with greensand. A bed of greensand of standard depth and one square foot area has a capacity of about ten thousand grains of hardness calculated as calcium carbonate. When this amount of softening of water has been done (such as softening five hundred gallons of water containing twenty grains of hardness), the bed must be regenerated. A square foot bed of Crystalite has twice the capacity of greensand, consequently it needs to be cleaned only half as often and thus reduces by fifty per cent, the amount of water wasted in cleaning and also the attention necessary for cleaning. The water softeners using this new type of zeolite are called the International Type C water softeners.

INDUSTRIAL NOTES

REPUBLIC MOTOR TRUCK

The Republic Motor Truck Company, Alma, Mich., has established a system of factory branches on the Pacific Coast from Los Angeles to Portland, those in Los Angeles, San Francisco and Portland being now in full operation with a factory manager in charge of each. The entire west coast system is under the personal supervision of R. H. Spencer as Pacific Coast manager. Each branch will maintain a large and complete stock of replacement parts for every Republic truck model.

SULLIVAN MACHINERY COMPANY OFFICES

On July 20th the Sullivan Machinery Co. moved its Boston office from Devonshire street to Suite 701, 45 Milk Street. Geo. H. Richey, manager, and the rest of the staff will be found in the new office after that date.

HARNISCHFEGER SALES ENGINEERS

The Harnischfeger Corporation announces the appointment of H. S. Beale as sales engineer in the New York territory, with office at 50 Church Street, New York. H. A. Wolcott, formerly in charge of the Miami office, has been appointed district manager of the New York territory with headquarters at the same address. S. B. Bubier has been appointed sales engineer for the Miami District, with offices at 343 S W. River Drive, Miami.

RACINE'S METALLURGICAL ENGINEER

The Racine Radiator Company announces the appointment of Ivan Racheff as metallurgical engineer in connection with chemical and metallurgical research with respect to industrial, truck, power unit and heavy duty type radiator manufacturing.

(Continued from page 40)

PROGRAM OF THE CONGRESS

The following program of the congress has been announced in circulars just received in the United States:

Monday, September 6. Morning: 9 a. m.—Meeting of the International Permanent Commission (Castello Sforzesco). Opening of the offices for distribution of membership cards, etc. 10:30 a. m.—Official sitting of the congress.

Afternoon: 2 p. m.—Sitting of the sections.

Evening: Receptions.

Tuesday, September 7. Morning: 9 a. m.—Sitting of the sections. Afternoon: 2 p. m.—Sitting of the sections. 4 p. m.—Visit to the exhibition and reception.

Wednesday, September 8. Morning: 9 a. m.—Sitting of the sections. Afternoon: 2 p. m.—Sitting of the sections. 4 p. m.—Visits.

Thursday, September 9. Visit to the Autodrome at Monza and the Autostrade. Milan Lakes. Lunch at the invitation of Ing. Gr. Uff, Piero Puricelli.

Friday, September 10. Morning: 11 a. m.—Sitting of the sections, with a view to arriving at conclusions. Afternoon: Visits or receptions.

EXCURSIONS

Saturday, September 11. Group a.—To Lake Maggiore; return to Milan the same evening. Group b.—To Lake Como; return to Milan the same evening.

Saturday and Sunday, September 11 and 12. Group c.—Milan, Tirano, Stelvio, Merano, Trento. Group d.—Milan, Tirano, Aprica, Tonale, Trento.

Monday, September 13. 3 p. m.: Official closing of the congress in Rome and official reception in the Campidoglio.

Tuesday, September 14. 9 a. m.: Archeological excursion.

SUBJECTS TO BE DISCUSSED

The program of subjects to be discussed by the congress, the names of the speakers for each subject, and the general speakers on each question are as follows:

I—CONSTRUCTION AND UPKEEP

First Question, Concrete Roads

Belgium.—(In collaboration): Messrs. E. Piens and Luyssen.

Denmark.—M. S. Ellert.

United States.—(In collaboration): Messrs. Clifford Older, J. Shirley Bright, Raymond W. Coburn, Charles R. Ege, Herbert J. Kuelling, Robert M. Morton, Frank T. Sheets, Leroy C. Smith, Charles M. Upham.

France.—Monsieur Féret.

Great Britain.—(In collaboration): A. Harrison, J. B. L. Meek, Richmond, W. P. Robinson.

Italy.—M. Franklin Colamonico.

Sweden.—Mr. Paul E. Wretlind.

Low countries.—Dr. L. R. Wentholt.

Second Question, Roads Using Bitumen and Asphalt

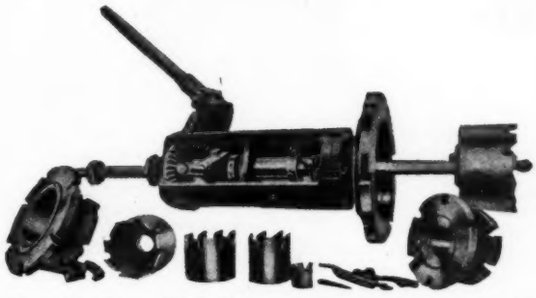
Belgium.—Mr. Van Moere.

United States.—(In collaboration): Messrs. Charles S. Pope, R. Keith Compton, W. Herbert Fulweiler, Christian P. Jensen, William H. Kershaw,

(Continued on page 52)

High Grade Water Works Supplies

THE SMITH TAPPING MACHINE



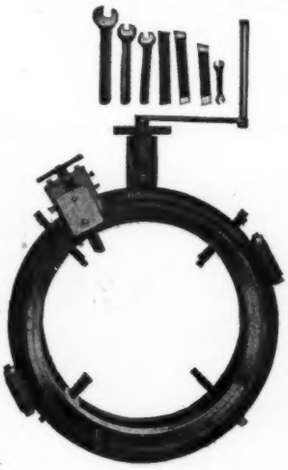
This Machine Will Make Connections to Any Size Mains Without Shutting Off the Supply

1. **It saves danger from fire when supply is off.**
2. **It saves annoyances to consumers.**
3. **It saves shutting down to set new hydrants.**
4. **It saves outlay of money for specials which may never be used.**
5. **It saves working at night to cut in old way.**
6. **It saves worry and anxiety to superintendent.**
7. **It saves money by having insurance rates reduced.**
8. **It saves its cost in a short time.**

Machines made in four sizes, to fit from 2" to 36", inclusive.

A FULL LINE OF WATER WORKS SPECIALTIES OF THE HIGHEST GRADE

Send for catalogue showing full line.



Pipe Cutting Machine

Cuts as easily and smoothly as if done in a lathe

No. 1. Size for Cutting 4", 6" and 8" pipe.

No. 2. Size for cutting 10", 12", 14" and 16" pipe.

No. 3. Size for cutting 18", 20" and 24" pipe.

No. 4. Size for cutting 30" and 36" pipe.

No. 5. Size for cutting 42" and 48" pipe.

The Smith Valve Inserting Machine

The Latest and Most Important Tool Devised to Aid Water or Gas Departments.

This machine will cut section of pipe, place required size valve in position, complete the work in every detail and all done without any interruptions to supply.

Write us and we will make you a proposition, either on purchase of machine or on a rental basis. **We guarantee to insert all sizes from 4-in. to 24-in., inclusive, without shutting off supply.**

Fire Hydrants

SMITH FIRE HYDRANTS are scientifically constructed to deliver the greatest volume of water under a given pressure. They are designed with easy-flow waterways without detours or obstructons which have a tendency to kill efficiency. Built strictly along hydraulic principles to meet the exacting demands of modern fire equipment. Built for rugged use. Adopted by many cities. Especially designed for high pressure service.

Devices for Filling Sprinkling Wagons

WILL pay for themselves in savings effected on repairs to hydrants. Will save great waste of water, as regular hydrants when used are usually left in leaky condition. No wrenches necessary to operate. Nothing to break. Nothing to get out of order.

The A. P. Smith Mfg. Co.

East Orange, N. J.

FEDERAL

"FEDERAL"

A BETTER FROST PROOF METER

All sizes comply with Specifications of the American and New England Water Works Associations.

FEDERAL A

The "Federal" Meter is designed to meet the demand for a better water meter, better in design, better in construction, better in quality and best in workmanship. These improvements are the result of exhaustive investigation, experiments and tests by specialists of wide experience.

The meter is made frost proof by a breakable cast iron bottom entirely rust proof, and fastened to the main casing by bronze bolts and nuts.

The measuring chamber is not distorted by freezing. If the meter is frozen, the frost bottom breaks and instantly liberates the measuring chamber unharmed.

It can be more easily and quickly taken apart and re-assembled than any other meter on the market. The mere removal of the casing nuts completely releases the entire internal mechanism.

Write for Literature and Prices.

The Federal Meter Corporation

MANUFACTURERS OF

HIGH CLASS WATER METERS

EAST ORANGE, N. J., U. S. A.

COST CUTTING "SCHRAMM" COMPRESSORS

SHOWING No. 120 "SCHRAMM" OPERATING A DRILL ON A SEWER JOB

Three Reasons Why:

Greater Horsepower—Buda Engine
Larger Compressor—Schramm
Clutch for Compressor Cut-out—Easy to Start

Write for New Catalogs and Details of Free Demonstration

SCHRAMM, INC., Manufacturers WEST CHESTER, PA.

Offices and Representatives in All Principal Cities

SCHRAMM, INC.

Brink's Fleet carries thirty million dollars a day

176

Internationals have been purchased by Brink's Express

The bodies of these trucks are made of two thicknesses of bullet-proof steel and the windshields of many of them are made of bullet-proof glass. Each truck contains a steel chest bolted to the floor and each is trailed by a rifle squad in another car.

Excerpt from Recent Letter:

"We doubt that it is necessary for us to tell you what we think of International Trucks. Our valuable cargoes amounting to nearly fifty billions of dollars in actual worth every year require the most dependable transportation on the market. We expect that kind of equipment from the Harvester Company and we are not disappointed."

(*Signed*)
BRINK'S EXPRESS COMPANY

HERE are the most exciting cargoes in the world — money, money, and still more money. Wealth like that of all the Indies rides in the armored Internationals of Brink's Express. Did you ever think of the tremendous and dangerous hauling problem presented by money in the mass?

That is the problem that Brink's Express has been solving for more than a quarter-century. In more than a score of metropolitan cities, Brink's Express transports the coin and currency of commerce and industry. Last year the trucks in Brink's formidable fleet, closely followed by expert rifle squads in automobiles, delivered over five million pay envelopes. In twelve months they carried over seven billion dollars, in cash, and over forty billions more in bank clearings, securities, and other valuables. Today they are the oldest and largest in the business.

And for the transportation of all this money they need the most dependable trucks that money can buy. They choose Internationals. To date Brink's Express has purchased 176 International Trucks — 75 of them since the first of this year.

International Trucks will serve your hauling needs as faithfully as they are serving Brink's Express and as they have served industry for over twenty years.

The International line includes the Special Delivery, 1-ton and 1½-ton Speed Trucks, Heavy-Duty Trucks ranging from 1½-ton to 5-ton sizes, Motor Coaches for all requirements, and the McCormick-Deering Industrial Tractor. Served by the world's largest Company-owned truck service organization—120 branches in the United States and 17 in Canada. Write for complete descriptive literature.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. *of* America *(Incorporated)* Chicago, Ill.

INTERNATIONAL HARVESTER TRUCKS

HARVESTER COMPANY

Chemicals
For Water Purification
For Treatment of Sewage
LIQUID CHLORINE
Single Unit Tank Cars | Multi-Unit Tank Cars (1-Ton Containers) | 150-lb. Cylinders
Chloride of Lime
Sulphate of Alumina
Highest Grades. Manufactured by
Pennsylvania Salt Manufacturing Co.
Executive Offices: Widener Building, Philadelphia
Representatives:
New York Pittsburgh Chicago St. Louis
Works:
Philadelphia and Natrona, Pa.
Wyandotte and Menominee, Michigan
Chlorine Distributing Station, Babbitt, N. J.

SOCIETY NEWS

(Continued from page 48)

Ralph E. Myers, Philip P. Sharples, Henry G. Shirley, Francis P. Smith.

France.—(In collaboration): Messrs. Chauve and Felix.

Great Britain.—W. J. Hadfield.

Italy.—(In collaboration): Messrs. Giuseppe Sdralevich, Ugo Conte.

Sweden.—Mr. M. K. Joseph Gednt.

Low Countries.—Mr. M. B. J. Kerkof.

Switzerland. — (In collaboration): Messrs. R. Schlaepfer and Dr. P. Schlaepfer.

Third Question, Standardization of Trials for Acceptance of Materials for Roads

Denmark.—Mr. M. H. Rygner.

United States.—(In collaboration): Messrs. Albert T. Goldbeck, Duff A. Abrams, Harold F. Clemmer, Prevost Hubbard, Claude L. McKesson, Horatio S. Mattimore.

France.—(In collaboration): Messrs. Bouteville and Vanneufville.

Great Britain.—M. W. J. Taylor.

Italy.—Mr. Luigi Torri.

Monaco.—Dr. Guglielminetti.

Switzerland. — (In collaboration): Messrs: R. Schlaepfer and Dr. P. Schlaepfer.

Czechoslovakia.—M. Karel Spacek.

II—CIRCULATION AND WORKING

Fourth Question, Census of Circulation

United States.—(In collaboration): Messrs. Henry R. Trumbower, Thomas R. Agg, J. Rowland Bibbins, Arthur H. Blanchard, William P. Eno, Ernest P. Goodrich, Laurence I. Hewes, John N. Mackall, William A. Van Duzer.

France.—Mr. Delemer Leon.

Great Britain.—C. H. Bressey.

Italy.—(In collaboration): Messrs. Ugo Cantalamessa, Antonio Albertini, Pietro Remondini.

Low Countries.—(In collaboration): Messrs. G. J. Van den Broek and Dr. J. H. Van Zanten.

Sweden.—Mr. Per Gustav Blidberg.

Switzerland.—Mr. A. Altweg.

Czechoslovakia.—Mr. Antonin Hlousek.

Fifth Question, Development and Organization of Towns in the Interest of Traffic

Belgium.—(In collaboration): Messrs. Maertens, Mulis, Luyssen, E. d'Hoop.

Brazil.—(In collaboration): Messrs. Da Silva Freire and J. Da Costa Ferreira.

United States.—(In collaboration): Messrs. Frederick L. Olmstead, Charles B. Ball, Harland Bartholomew, Frederic A. Delano, Frederick H. Fay, Morris Knowles, Arthur A. Shurtleff, Arthur S. Tuttle, George S. Webster, E. P. Goodrich.

France.—Mr. Massard.

Great Britain.—(In collaboration): Chief Constable A. Bassom, J. L. D. Elliott, H. Vaughan Lanchester, G. L. Pepler.

Italy.—(In collaboration): Messrs. Massimo Settimi and Tognetti.

Low Countries.—(In collaboration): Messrs. L. N. Holsboer and A. H. Sirks.

Sweden.—Mr. Carl Gustav Bergman.

Switzerland.—Mr. E. Bosshard.

Czechoslovakia.—Mr. Posef Prada.

Sixth Question, Roads Specially Reserved for Motor Cars

Belgium.—(In collaboration): Messrs. Cauterman, M. De Graer.

China.—M. Ouang Hang.

United States.—(In collaboration): Messrs. Thomas H. MacDonald, John A. Macdonald, W. G. Sloan.

France.—(In collaboration): Messrs. E. Chaix and Gaston Raffard.

Great Britain.—Sir Lynden Macassey.

Italy.—(In collaboration): Messrs. Avv. Francesco La Farina, Eng. Gaetano D'Alò, Marquis Avv Paolo Sommi-Picenardi, Alberto Depetrini.

Low Countries.—(In collaboration): Messrs. D. A. Van Heyst, G. J. Van den Broek, P. J. Van Woorst Vader, Jr.

Sweden.—Mr. Adler (Knut Kristian).

General Speakers

First question: Engineer Angelo Rampazzi.

Second question: Engineer Italo Vandone.

Third question: Engineer Michelangelo Bohm.

Fourth question: Engineer Luigi Frosali.

Fifth question: Engineer Cesare Albertini.

Sixth question: Grand Uff. Michele Carlo Isacco.

NEWS OF THE SOCIETIES

Oct. 4-9—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention at Philadelphia, Pa.

Oct. 7-15 — ALL-WESTERN ROAD SHOW. Second exhibition at San Francisco, Cal.

Oct. 11-14 — AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting at Buffalo, N. Y.

Oct. 11-15 — SOUTHWEST WATER WORKS ASSOCIATION. Fourteenth annual convention at Shreveport, La.

Oct. 28-30—CALIFORNIA SECTION, A. W. W. A. Seventh annual convention at San Diego, Calif.

Nov. 3-5—IOWA SECTION, A. W. W. A. Twelfth annual meeting at St. Louis, Mo.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

Nov. 8-12—AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at Pinehurst, N. C.

Nov. 8-12—ASPHALT ASSOCIATION. Fifth annual asphalt paving conference at Mayflower Hotel, Washington, D. C.

Dec. 2-3 — HIGHWAY RESEARCH BOARD, NATIONAL RESEARCH COUNCIL. Sixth Annual meeting at Washington, D. C.

Jan. 10-14 — AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago, Ill.

NORTH CAROLINA SECTION AMERICAN WATER WORKS ASSOCIATION

The sixth annual convention of this section was held at Cape Fear Hotel, Wilmington, N. C., on August 23rd to 26th. The officers elected for the coming year were: President, C. M. Grantham, of Goldsboro; Vice President, C. E. Rhyne, of Gastonia; Secretary-Treasurer, H. G. Baity, assistant engineer, State Board of Health; new member of the Executive Committee, W. E. Vest, Charlotte.

Durham was chosen as the place of meeting for next year, where the convention will be held during the month of November.

Among the papers read were the following: "Consolidation of Street Lighting Plants with Pumping Stations," by F. G. Godfroy; "Deep Well Piping Layout for Air Lift Pumps," by McKean Maffitt; "Deforestation, Its Results and Remedy," by Warren E. Hall; "Troubles with Algae Growths in Well Water Stored in Open Reservoirs," by J. W. Kellogg; "Gridiron Layout with Special View to Fire Protection," by W. C. Cates; "Forty Years' Experience in One Pumping Station," by J. H. Sweeney; "Methods and Psychology to Be Used with the Customer," by C. M. Grantham; "Permissible Pollution in Surface Streams Used for Public Water Supply," by J. K. Hoskins.

CALIFORNIA SECTION, AMERICAN WATER WORKS ASSOCIATION

The seventh annual convention of this association is to be in San Diego, Calif., October 28th-30th. The entertainment features will include a trip to the Lower Otay dam and filter station. William Mulholland, Chief Engineer of the Department of Public Service of Los Angeles, will describe the Colorado River project. The Water Works Manufacturer's Association will give an informal dinner dance on Friday evening. The following papers will be presented: "Description of the Impounding Works of the San Diego Water System," by R. C. Wueste; "The Biological Control of Impounding Reservoirs," by Dr. Carl Wilson; "Report on Water Meter Maintenance Methods," by J. H. Fagg; "Progress in Electrolytic Chlorination at Sacramento Filtration Plant," by Harry N. Jenks; "Corrosion Problems of a Water Supply System and Methods of Protection," by E. B. Stewart; "Equitable Charges for Automatic Sprinkler Connections," by Major William Cartwright; "Underground Waters and Pumping Therefrom," by George W. Trauger and Edmund K. Barnum; "The Duty of Water in General Municipal Uses," by Charles Lee; "Iodine in Drinking Water," by C. G. Gillespie.

IOWA SECTION, A. W. W. A.

The twelfth annual convention of the Iowa Section, American Water Works Association, will be held at the Hotel Statler, St. Louis, Mo., November 3rd to 5th. (At present not only Missouri but also Nebraska and South Dakota are included in the Iowa section.) It is planned to have round table discussions and papers morning and afternoon of the 3rd and 4th and evening of the 3rd. Friday will be devoted to visits to the St. Louis water works. Several of the members are expected to address local luncheon clubs on the necessity for support of water departments and their officials.

SOUTHWEST WATER WORKS CONVENTION

At the fourteenth anual convention, to be held at the Washington Hotel, Shreveport, La., October 11 to 15, the following will have exhibits: R. D. Wood & Co., Hersey Manufacturing Co., Pittsburgh Meter Co., A. P. Smith Mfg. Co., Federal Meter Co., Rensselaer Valve Co., American Cast Iron Pipe Co., Paradon Engineering Co., Neptune Meter Co., Mueller Co., McWane Cast Iron Pipe Co., Columbian Iron Works, Pitometer Co., Sullivan Machinery Co., Wallace & Tiernan Co., Birch Manufacturing Co., Layne & Bowler Mfg. Co. and H. W. Clark Co.

PRIZE FOR ESSAY ON HIGHWAY WORK

The American Road Builders' Association is offering prizes for articles describing methods, materials or equipment and their application to the economic construction, maintenance or operation of highways. For the best essay the prize is travelling expenses to and from the Chicago convention and hotel expenses January 11, 12 and 13. The second and third prizes are $150 and $75 in cash. The essay must be limited to 1500 words and must be mailed to the office of the American Road Builders' Association at Raleigh, N. C., on or before October 10th. Any engineer of the rank of inspector, rodman or above, except state highway engineer, who is connected with a city, county or state highway commission, is eligible.

LEAGUE OF CALIFORNIA MUNICIPALITIES

The twenty-eighth annual convention of the league was held at Yosemite Valley August 16th to 19th, with an attendance of about eight hundred, including guests. Sacramento was chosen for next year's convention. John J. Sippy, district health officer of Stockton, was elected president; H. A. Mason, bond and insurance expert, San Francisco, as secretary-treasurer; and Wm. J. Locke was continued as executive secretary. Among the resolutions adopted was one urging "the enactment of legislation establishing a sewage and industrial waste commission to carry on investigation and make reports upon economical and satisfactory ways of treating sewage and trade wastes"; another creating as a department of the league a permanent division on city and regional planning; one that "at all future conventions at least one hour during the convention shall be allotted to the exhibitors for a review of their displays"; and one protesting against a proposition, to be voted on in November, that all funds raised by the gasoline tax which it is proposed to increase from two to three cents be devoted to the construction of state highways, the convention believing that a part should go to the cities for city streets.

The most noteworthy feature of the convention was a paper entitled "The Law of Zoning" by Rollin L. McNitt; and next in importance was a symposium on sewage disposal, led by Chester G. Gillespie in a paper "Recent Developments in Methods of Sewage Disposal."

The special amusement feature was a barbecue given by the Yosemite Park & Curry Co., followed by community singing and a war dance by the Yosemite Indians.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

An outline program for the thirty-second annual convention of this society, to be held at the Hotel Mayflower, Washington, D. C., November 8 to 12, has been sent to the members in the first issue of what may develop into a quarterly bulletin. Monday afternoon is assigned to meetings of the executive and specifications committees. Monday evening, opening addresses and reports of officers and committees. Tuesday morning and afternoon, papers on paving, street cleaning and lighting, and public safety. Tuesday evening, smoker. Wednesday morning, papers on city plan-

ning, public welfare, municipal legislation and finance; afternoon, report of specifications committees and representatives in other organizations; evening, banquet and dance. Thursday morning, joint meeting with the asphalt association; afternoon, boat trip; evening, papers on sewerage, sanitation, refuse disposal and water works, and adjournment.

ASPHALT PAVING CONFERENCE

The Fifth Annual Asphalt Paving Conference will be held at Washington, D. C., November 9 to 12—the same time and place as the convention of the American Society for Municipal Improvements; and on Thursday morning the two will hold a joint session.

On Tuesday morning Prof. A. H. Blanchard will speak on "Adaptation of City Pavements to Country Highways"; to be discussed by J. B. Pridgen and E. E. Butterfield. A paper "Construction of Granite Block Pavements with Asphalt Filler" will be read by C. M. Pinckney. In the afternoon George H. Moses, chairman of the Senate Committee on Post Offices and Post Roads, will present a paper "Basic Policies Which Should Govern Highway Improvement"; Jay Downer will describe the "Parks and Parkways of Westchester County, N. Y."; and N. S. Anderson "Surface Treatment by Hot Application Method." A Contractors' Session will hold a general discussion on the topics: "Should Paving Contractors Be Licensed?" and "Cost of Incompetent Inspection to Contractor and Owner." Motion pictures will be shown by courtesy of the U. S. Bureau of Mines illustrating production of petroleum and its products, and by courtesy of the U. S. Bureau of Public Roads showing construction of asphalt pavements.

On Wednesday morning "Causes of Success and Failure of Bituminous Macadam Pavements" will be the subject of a paper by G. H. Henderson, discussed by S. E. Fitch and others. R. M. Smith will present a paper "Asphalt Macadam Mixing Method"; Linn White one on "Development of Asphalt Paving Types in South Park, Chicago"; and W. B. Catchings on "Cold Application and Cold Patch for Surface Treatment." The afternoon session will be held under the auspices of the Association of Asphalt Technologists in the auditorium of the National Research Building, with the following papers: "Researches on Bituminous Paving Mixtures," by W. J. Emmons; "The Voidage Theory of Asphalt Paving Mixture Design in Practice, with Special Reference to Shear Strength Methods of Testing," by Gene Abson; "Correlation of Stability Tests with the Behavior of Pavements Under Traffic," by Prevost Hubbard and F. C. Field; "Cross-Sectional Design of Asphalt Pavements," by A. T. Goldbeck; and "Gasoline Deterioration Tests for Asphalt Paving Mixtures," by Henry L. Howe, Jr.

The joint session on Thursday morning will include a paper, "Construction Details Essential to Effective Hot Mix Pavements," by Francis P. Smith, discussed by W. W. Horner and A. F. Macallum; "Black Base and Its Place in Standard Specifications," by Hugh W. Skidmore, discussed by A. K. Vickery and H. F. Harris; and "Economics of Salvaging Old Pavements," by Col. R. Keith Compton, discussed by R. H. Simpson. In the afternoon the convention will attend the Pimlico races as guests of the Standard Oil Co.

NEW ENGLAND WATER WORKS ASSOCIATION

The 45th annual convention was held at Providence, R. I., September 14 to 17, the program for which was published in our September issue. Frank E. Winsor was elected president, and Arthur D. Weston vice-president; only 40 per cent. of the members voting in the letter ballot.

The secretary reported the total membership to be 744, a net loss of 7 during the year. The finances are in good condition, the permanent investment fund being $13,000, or $5,000 more than a year ago. The Dexter Brackett medal for 1925 was awarded to John F. Laboon for his paper describing the filtration plant of Wheeling, W. Va.

The convention directed the appointment of a committee to report on the desirability of the advocacy by the as-

(Continued on page 44)

PERSONALS

Frank E. Winsor, recently chief engineer of the Providence, R. I., Water Supply Board, has been chosen chief engineer of the special commission appointed to provide an additional water supply for the Boston Metropolitan District.

Wm. W. Peabody, recently deputy chief engineer under Mr. Winsor, has been appointed to succeed him as chief engineer of the Providence Water Supply Board. His place will be filled by Francis B. Marsh, formerly designing engineer of the board, and his position, in turn, will be filled by Earl C. Craig, assistant engineer with the board.

H. V. Pederson, formerly state sanitary engineer of Iowa, has been appointed superintendent of water works at Marshalltown, Ia.

Samuel A. Hart, formerly in the city engineering office at Sacramento, Calif., has been appointed assistant city engineer of that city.

Walter L. Draeger, formerly engineer at the Denver office of the U. S. Bureau of Reclamation and before that assistant city engineer at Schenectady, N. Y., has been employed by the J. G. White Engineering Corporation and will be located at Aguas Calientes, Mexico.

E. W. Fassett, recently city engineer of Caspar, Wyo., has been appointed city manager of El Reno, Okla.

R. S. Wallis, formerly with the engineering extension department, Iowa State College, has been appointed city manager of Manistique, Mich.

Arthur T. Clark, formerly superintendent of the Municipal Commission of Herkimer, N. Y., is with the South Bay Consolidated Water Co., with headquarters at Bay Shore, L. I.

H. T. Ford, formerly with the Rome, Ga., Light & Railway Co., has been appointed manager of public utilities in the engineering department of that city.

W. S. Tomlinson, recently city engineer of Columbia, S. C., has resigned to give all his time to private business as president of the Tomlinson Engineering Company.

L. M. Grant, formerly general manager of the Continental Pipe Mfg. Co., has been appointed superintendent of the Water Department of Seattle.

A. W. Smith, city engineer of Peru, Ind., died in that city on June 29th.

Lewis E. Robert has been appointed city engineer of Peru, Ind.

Paul Bailey, formerly Deputy State Engineer of California, has been appointed State Engineer, succeeding the late W. F. McClure.

Col. Washington A. Roebling, president of the John A. Roebling's Sons Co., died at Trenton, N. J., on July 21st. Col. Roebling and his father became world famous as the engineers who designed and constructed the Brooklyn Bridge.

Beekman C. Little, formerly Superintendent of water works for Rochester, N. Y., has resigned this position to become full-time secretary of the American Water Works Association. His office will be at 170 Broadway, New York City.

Arthur McMullen, president of the Arthur McMullen Company, contractors of New York City, died August 16th, age 72 years, from injuries inflicted by a taxicab.

David A. Hartwell, commissioner of public works of Fitchburg, Mass., where for 20 years he had charge of the sewage disposal works and sewerage system, which are among the best known in the country, died August 3rd, age 68 years.

A. E. Rolinson, formerly city manager of reading Calif., has been appointed city manager of Santa Barbara, Calif.

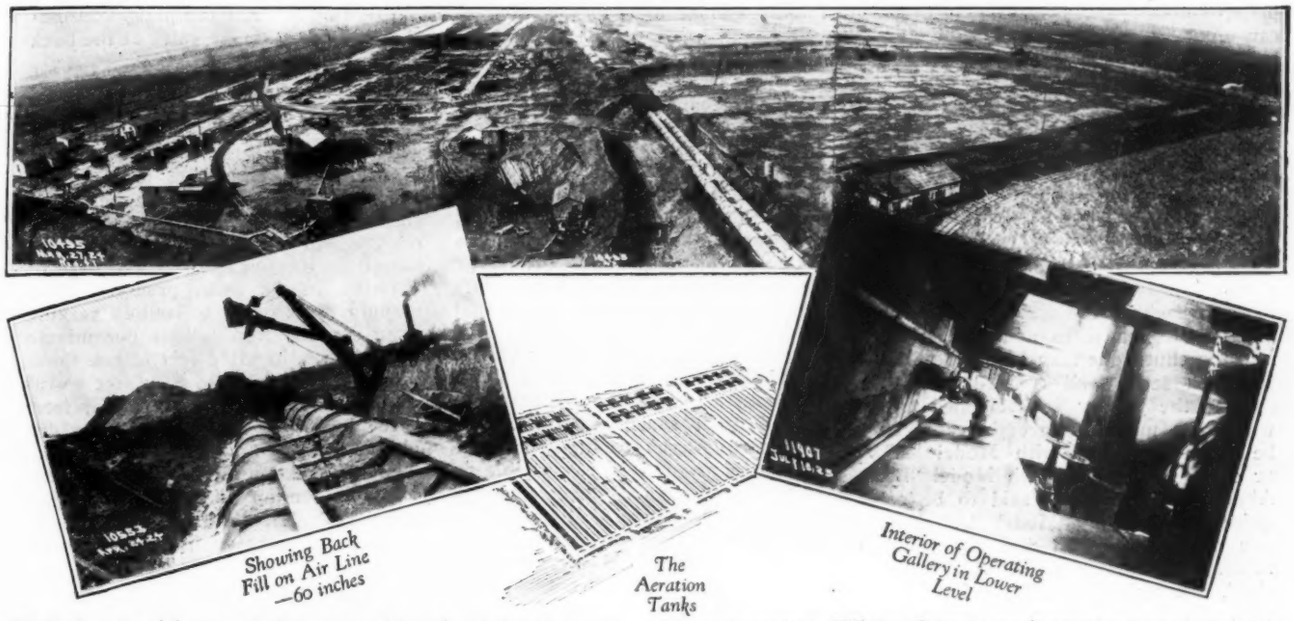
Geo. A. Schwaeland has been appointed city engineer of Maywood, Calif.

L. M. Helmreich, formerly chief electrical and mechanical engineer for the Missouri State Public Service Commission, has been appointed general superintendent of the Jefferson City Water Company.

Arnold Kraeft has been appointed city engineer of Beaver Dam, Wis.

A. F. Morris, formerly manager of highway work in Panama for R. W. Hebard & Co., has been appointed director of roads for the Ministry of Public Works of Persia.

1 Solution That Met 4 Different Problems And Gave More Service, Too



Showing Back Fill on Air Line —60 inches

The Aeration Tanks

Interior of Operating Gallery in Lower Level

IN the building of the new North Side Sewage Treatment works of the Sanitary District of Chicago, four distinct problems in the handling and treatment of sewage arose that involved the use of pipe. They were:

Problem No. 1. Great care and large amounts of money had been expended to provide equipment for cleansing the air, so that it would diffuse through the plates in the aeration tanks. The problem was to get the air to these plates in the same clean state. 60-inch air lines of Cast Iron Pipe were selected as being best fitted to transport the air free from rust, scale or other material, that might clog the diffusion plates.

Problem No. 2. Between the aeration and settling drains there is a pressure drain for carrying off sewage. The problem was to find the material best suited for this drain. 36-inch Cast Iron Pipe was selected for the pressure section. Where there is no longer any pressure, the main drain is of concrete.

Problem No. 3. The sludge which settles in the settling tanks is returned to the main building for retreatment with the incoming sewage. This is done under pressure and the material is abrasive. Again 36-inch Cast Iron Pipe was specified.

Problem No. 4. Water for use throughout the plant enters the service building and is redistributed from there. The pipe lines are all underground so 8-inch Cast Iron Pipe was selected.

It is significant that combined with the special qualities that met these four particular problems, this user—and thousands of others—secured also the great guarantee of permanence found in the unquestioned and unrivaled durability of Cast Iron Pipe.

For information on pipe lines, ask this Bureau.

Address: Research Engineer

The Cast Iron Pipe Publicity Bureau, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT

THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

BAKER CAR UNLOADER

The Baker Steel & Machinery Company, Omaha, Neb., manufactures a car unloader that is moved from one car to another under its own power. It is attached to a Fordson tractor and includes a power takeoff, double drum winch, tripod, discharge chute, scoops and cables. Two legs of the tripod rests upon one side of the car and the third leg in Model "A" is attached to the other side of the car and in Model "B" to the Fordson. Cables pass from the double drum through sheaves attached to the tripod to scoops within the car by which the material is drawn to and discharged into the chute, one man being required for each scoop and a third man to operate the power. It is claimed that with three men, six to eight cars can be unloaded a day with Model "A", or eight to ten cars with Model "B". About five minutes is said to be required for moving Model "A" from one car to the next and about one minute for moving Model "B". If desired, the unloader will be furnished with an individual gasoline engine mounted on steel trucks, the engine being a LeRoi two-cylinder, 8 horse power gasoline engine.

WIRE SCREENS AND WIRE CLOTH

Wire screens and wire cloth for almost all purposes are made by the Buffalo Wire Works Co., Inc., Buffalo, N. Y. Among the uses are wire cloth for testing laboratory screens, sand and gravel screens 26 inches wide by 6 feet long, screens for the suction ends of intake pipes, tree guards, etc. Screens are furnished either plain or galvanized either before or after weaving; also of copper, and brass, and of other metals to meet special conditions.

NYE STEAM PUMP

The Nye Steam Pump & Machinery Company, Chicago, manufactures a pump which consists of two connected hollow cylinders with discharge chamber at one side, all cast in one piece forming the main body of the pump; the bottom of these three chambers containing suction and discharge ports. At the top the two cylinders are sealed by a steam yoke connection embodying the Nye spray basket jets. This yoke carries a pair of air valves, and a hollow steam valve that floats in its chamber. This valve is extremely simple and sensitive to pressure, vacuum and its own gravity—the operating mediums—and is responsible in a high degree for the steam economy claimed for this pump. Its function is admission of steam to the filling cylinder in time to aid the air cushion, overcoming shock from ram action of the rising column of water. Following the cushioning function, the steam valve admits steam for the discharge. Filling of the alternate cylinder cuts off the supply of steam, permitting expansion of the residual charge, thereby causing discharge from both cylinders simultaneously, which results in a sustained momentum, an almost imperceptible increment being the only evidence of the overlapping of the discharge cycles.

Priming is not required if the suction lift is small, but if it is desired to pump air and water at the bottom of the suction, keeping the water down so that the workmen can work to good advantage, a small amount of water can be run through the pump continually through an angle valve at the back of the pump.

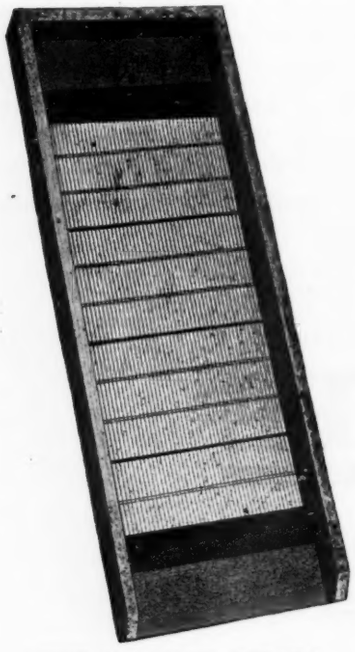
The pump has no pistons or plungers. It can be either suspended from above or supported from below. It will pump muddy or sandy water and is useful for cofferdam and caisson work, dewatering trenches, etc. It is claimed that it is impossible for sand or mud to affect its operation and that it will automatically take care of variation in the boiler pressure. It is manufactured with capacities varying from one hundred gallons per minute lifted to one hundred feet to one thousand gallons raised to fifty feet elevation, using suction lines varying from three inches to seven inches and discharge lines one inch less in each case. The boiler horse power required varies from ten for the small size pump against 25 feet head to fifty for the largest size pump against 100 feet head.

THE KROHN KOMPENSATOR

This compensator for Ford trucks is described in the article "New Equipment for Public Works Construction" in this issue, page 329. The cut was received too late to be included in that article and is accordingly inserted here.

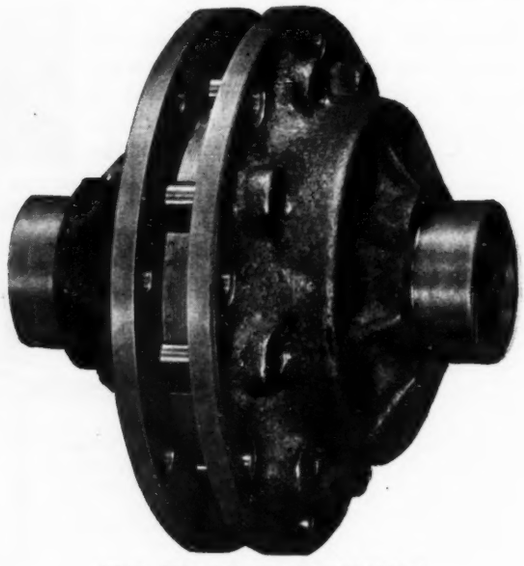
STREET AND TRAFFIC SIGNS

Signs for all kinds of purposes are manufactured by the Niles Machine Co., Lebanon, N. H., both cast aluminum and cast iron being used and provision made for mounting on posts, suspended from brackets, or other mounting. A typical sign is that known as No. S 51 in which two signs at right angles are assembled on top of a two-inch pipe post with a traffic arrow below. Panels and arrow



BUFFALO SAND SCREEN

NILES TRAFFIC SIGN

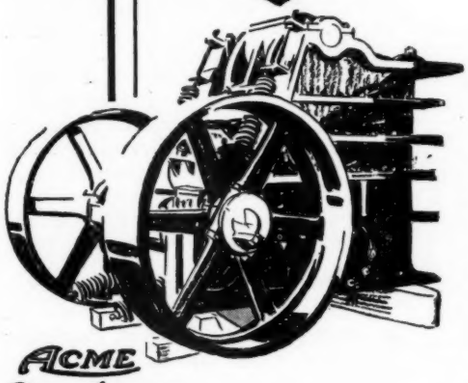


THE KROHN KOMPENSATOR

ACME

25 Years

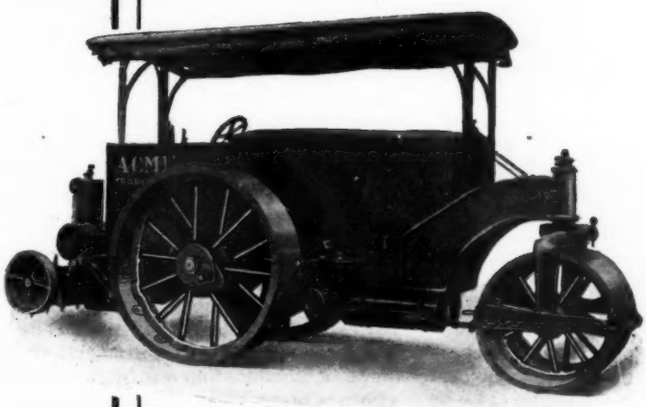
of Road Building Service



The Acme Open Hearth Cast Steel Rock Crushers. Capacity 8 to 250 tons per hour. Convenient and economical. The most durable machine on the market.

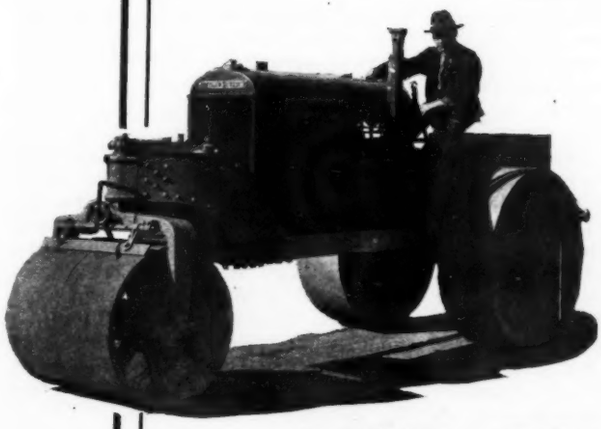
ACME Crushers

For the past 25 years we have been building road equipment to meet every requirement in road construction.



4-Cylinder Motor Rollers —4 to 14 tons. A practical and serviceable machine of great durability that will give years of efficient service.

ACME equipment has stood the test during all those years and today the name ACME is a standard with municipalities and construction companies the world over.



Pony Rollers —5 to 10 tons inclusive. Powered with McCormick-Deering Power Plant. 5 to 8 tons sizes can be equipped with plow attachment.

Our years of experience building road equipment is at your service.

ACME ROAD MACHINERY CO.

FRANKFORT, N. Y.

PACIFIC COAST DISTRIBUTORS:
The Edward R. Bacon Co., Folsom at 17th St., San Francisco, Cal.
Clyde Equipment Company, Portland, Oregon
Contractors Equipment Co., 1910 Santa Fe Ave., Los Angeles, Cal.
National Machinery and Equipemnt Co., 95 Connecticut St., Seattle, Wash.

COMPLETE ROAD-BUILDING AND QUARRY EQUIPMENT

MOTOR ROLLERS	TANDEM ROLLERS	SCARIFIERS	GRADERS	ELEVATORS	BINS
STEAM ROLLERS	CRUSHERS	CONVEYORS	SCREENS	WAGONS	PULVERIZERS

are made of cast aluminum alloy which is claimed to be practically indestructible and absolutely rust proof and the letters being cast as part of the sign can not become loose or wear off. The standard sizes are panelled 4 inches or 5 inches wide with 2½-inch letters; a traffic arrow 4 inches wide and 32 inches long, both with black enamelled letters and border on aluminum background. These have pipe connecting couplings for 2-inch pipe, or a 2-inch threaded post cap for 4 x 4-inch wooden post.

INDUSTRIAL NOTES

REPUBLIC MOTOR TRUCK CO. IN PHILADELPHIA

This company, whose home office is at Alma, Mich., has opened a direct factory branch at Philadelphia, Pa., at 26th and Moore Streets. C. L. Bowler has been appointed branch manager. Up-to-date shop equipment and a complete stock of Republic parts are now carried here, with factory-trained service men in charge.

BYERS MACHINE CO. MANAGER

H. C. Beckwith, for eleven years general manager of the Byers Machine Co., has resigned but will retain an official connection with the company as vice-president, serving in an advisory capacity.

COWHAM ENGINEERING CO. MANAGER

The Cowham Engineering Co., designers, builders and operators of cement plants, announce the appointment of K. H. Talbot as manager of cement sales. He was formerly with the Centrifix Corporation and before that with the Koehring Co. and the Universal Portland Cement Co.

"STOP THROUGH TRAFFIC" PLAN

The traffic engineering division of the American Gas Accumulator Co. is offering three types of signals—crystal reflector sign, flashing traffic beacon, and flashing curb beacon, to be used in connection with the adoption of the "Stop through traffic" plan of regulating traffic at main highway intersections. It has published a folder explaining the plan and what is necessary for inaugurating it.

CLIMAX REPRESENTATIVES.

The Climax Engineering Company, Clinton, Iowa, announces the appointment of the Maerky Machine Works, 240 Cherry Street, Philadelphia, Pa., as official parts and service station in that city and vicinity. Geo. M. Strohlein is proprietor and manager.

CLIMAX ENGINES LISTED BY UNDERWRITERS

The Climax Engineering Company, Clinton, Iowa, announces that the Underwriters Laboratories have listed Climax engines as approved for fire protection purposes and states that these are the first medium-speed industrial engines to receive the approval of the Underwriters Laboratories for driving 750-gallon and 1,000-gallon pumps. The engines passed by the Underwriters are Models "R 4 U" and "R 6 U", being basically the same engine that is being used largely in the industrial world for cranes, shovels, locomotives, pumping and generator sets.

DRIVE CHAIN CONFERENCE

The Link Belt Co., Chicago, on July 7th, 8th and 9th held at Indianapolis, its sixteenth Drive Chain Conference. Here fifty sales representatives discussed methods of improving the business and a word-by-word analysis of the forthcoming edition of the 1926 Link Belt Silent Chain Data Book.

GENERAL PIPE CLEANING COMPANY

A company with the above name has been formed for cleaning water mains of all sizes. The officers are Charles Haydock, president; W. R. Conard, vice president; Norman V. Bureau, secretary and treasurer. The offices are at 23rd and Westmoreland streets, Philadelphia. The appliances which the company will use have been developed and patented by Messrs. Haydock and Bureau, who have had wide experience in cleaning mains for the Pennsylvania R. R. Water Company.

GENERAL EXCAVATOR COMPANY

There was recently organized at Marion, Ohio, the General Excavator Company, which purchased the lands, buildings and equipment for more than 25 years used by the Fairbanks Steam Shovel Company for the manufacture of excavating machinery. The company expects to begin, probably in October, turning out a new half-yard combination shovel, drag-line, crane, back-trencher and level street grader, operated by either gasoline or electric power and mounted on continuous treads. It is stated that the machine will be on exhibition at the Road Show in Chicago next January.

(*Continued from page* 40)

sociation of abolition of cross-connections, and one to study the practicability of the use of thermit for thawing mains and hydrants as suggested by Dr. T. Howard Barnes, Professor of Physics of McGill University, in his paper on "The Theory and Use of Thermit Heat Units for Relieving Ice Troubles." The Committee on Standard System of Sanitary Scoring of Water Supplies present a progress report.

In addition to hearing eight papers describing features of the new water supply the members made a trip of inspection to the new impounding reservoir and filtration plant.

There was comparatively little discussion of the papers, a majority of them being descriptions of the Providence water works and of various appliances and materials offered by manufacturers to water works superintendents. There was, however, active discussion on the subject of cross-connections with supplies of doubtful purity, introduced by S. H. Taylor. As at the convention of the American Water Works Association last June, representatives of the Factory Mutual Insurance Company urged that such connections be allowed if supplied with valves, and water works superintendents strongly opposed it and, as at Buffalo, passed a resolution asking the president to appoint a committee to prepare a resolution stating the opposition of the society to cross-connections, to be considered for adoption at one of the fall or winter meetings. It is apparent that the Factory Mutual decided this year to make a determined effort to put this matter over; and that the great majority of superintendents, at least those who attend conventions, as well as the State Sanitary Engineers, are against it.

Considerable interest was taken in Dr. Barnes' explanation of the action of thermit heat waves and his suggestion of the use of them for thawing frozen mains and hydrants and the society accepted his offer to cooperate with him in testing out the idea.

Although there was no special session set apart for papers by manufacturers of appliances and materials, as is the practice with some societies, several such papers were scattered through the program. Under the title "Some Recent Applications of the Venturi Principle," F. N. Connet of the Builders Iron Foundry traced briefly the history of the venturi meter and its appurtenances. A paper by Benjamin Talbot, of England, read by John L. W. Birkinbine, the American representative, described the Talbot hydro-carbon lining for iron and steel pipes, a combination of bitumen and siliceous material finely ground, applied to the interior centrifugally (described in our September issue), which has been taken over by the United States Steel Corporation. Under the title "Mechanical Ditch Digging" Earle F. Lamprey described the use of the Barber-Greene vertical boom and bucket ditch digging machine for trenching for mains and services. "Making Pipe Centrifugally in a Refractory Mold" ("Acipco mono-cast" pipe) was described by E. W. Herrmann of the American Cast Iron Pipe Co. William J. Orchard of Wallace & Tiernan Co. spoke on "Some Phases of Chlorination"; while Dorr apparatus for use in "Mechanically Cleaned Sedimentation Basins for Water Works" was described by Edmund B. Besselievre.

Contrary to the ordinary procedure of similar societies, the President's address came at the close of the convention rather than the beginning, and comparatively few were present to hear his review of the year's doings of the society and the suggestion of closer cooperation with the American Water Works Association.

NEWS OF THE SOCIETIES

Nov. 3-5—IOWA SECTION, A. W. W. A. Twelfth annual meeting at St. Louis, Mo.

Nov. 8-12 — AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Thirty-second annual convention at Washington, D. C.

Nov. 8-12—AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at Pinehurst, N. C.

Nov. 8-12—ASPHALT ASSOCIATION. Fifth annual asphalt paving conference at Mayflower Hotel, Washington, D. C.

Dec. 2-3 — HIGHWAY RESEARCH BOARD, NATIONAL RESEARCH COUNCIL. Sixth Annual meeting at Washington, D. C.

Jan. 10-14 — AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago, Ill.

Jan. 19-21—KENTUCKY-TENNESSEE SECTION, A. W. W. A. meeting at Memphis, Tenn.

Jan. 17-19—NATIONAL SAND AND GRAVEL ASSOCIATION. Eleventh annual convention at Cincinnati, O.

Feb. 16-18—ASSOCIATION OF STATE HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES. Third annual convention at Atlantic City, N. J.

June 6-11 — AMERICAN WATER WORKS ASSOCIATION. 47th annual convention at Chicago, Ill.

INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS

The Board of Governors has set, as the time and place for the next meeting of this association, Monday and Tuesday, January 10th and 11th, 1927, at the Statler Hotel, St. Louis, Mo. In sending this notice to the members and others interested, President Theodore Eichhorn suggests that tickets be bought to Chicago via St. Louis, with a stop in St. Louis for the I. A. S. S. O. annual conference, arranging to go after the conference to Chicago by a special car which the society will have for its delegates. to attend the Road Show in Chicago.

ASSOCIATED GENERAL CONTRACTORS

The fall meeting of the Executive Board, Advisory Board, Presidents' Council, and Secretaries' Council was held at Kansas City, Mo. October 4th-7th There were 170 in attendance, breaking all previous records. Among the topics discussed were such issues as day labor, surety bonding conditions, misuse of lien laws, application of standard contract forms, and standardization of equipment. Matters especially relating to the operation of building contractors were discussed in a separate session held on the second day of the meeting, while highway builders were gathered at the same time in another division of the meeting. On the following day the building and highway contractors reunited in joint sesion. On the fourth day, executive secretaries of local units of the association met to discuss ways and means of putting into effect the conclusions reached by the full meeting during the three preceeding days.

After discussing the matter of quantity survey, the following resolution was adopted:—"Resolved that the Building Section of the A. G. C. looks with interest on the advisability of bureaus of quantity survey in and under the supervision of chapters of the A. G. C. The section believes standardization of methods and results are essential and to this end advises that ways and means be provided to direct and educate all chapters as to its cost, utility and its limitations."

AMERICAN ROAD BUILDERS' ASSOCIATION

Official nomination has been made of officers for this association for the year 1927-1928 and directors for three years, by the nominating committee elected by the association last January. The official nominations are as follows: For president, C. M. Babcock, state commissioner of highways of Minesota. For vice-president, W. A. Van Duzer, deputy engineering executive of the Pennsylvania Department of Highways; S. T. Henery, director Pan American Confederation for Highway Education; S. F. Beatty, vice-president Austin Western Road Machinery Company; and Samuel Hill, honorary life president, Washington State Good Roads Assn. For treasurer, James H. MacDonald, of New Haven, Conn. For Directors for three years, J. R. Draney, Richard Hopkins, B. H. Wait, Edward E. Duff, Jr., A. E. Horst, T. A. Little, and Fred White; the last being chief engineer of the Iowa State Commission, while the others are contractors or representatives of contractors or of manufacturers of building materials. Further nominations by petition may be received at the office of the association on or before November 10th.

AMERICAN WATERWORKS ASSOCIATION

The Secretary of the American Waterworks Association has announced that the Executive Comittee has selected June 6 to 11th, 1927 for the 47th annual convention of that association. It will be held at Chicago, Illinois, at the Hotel Sherman.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

The advance program of this society for the convention to be held at Mayflower Hotel, Washington, D. C. on November 8th is briefly outlined below. The executive committee and the various specification committees will meet on Monday afternoon, beginning at 2:00 o'clock. The formal opening of the convention will be held that evening at 8:00 o'clock, at which the president's address and the reports of the executive committee, secretary, treasurer, and finance committee will be received, and proposed amendments to the constitution introduced.

TUESDAY SESSIONS

Tuesday morning, in addition to reports scheduled for a number of committees, the following papers will be read: "Recent Development of Design of Concrete Pavement," by H. Eltinge Breed; "Recent Development in the Design and Construction of Cement Pavement and Pavement Bases," by A. R. Hirst; "Tests of Brick Pavements," by J. F. Pauls; "The Theory and Practice of Asphalt Pavements," by A. W. Dow; "Maintenance Data of Roads in Cuyahoga County," by F. A. Thomas; 'Municipal Engineering in the Tropics," by Henry Welles Durham; "Further Experiments on the Durability of Concrete in Sea Water," by E. E. Butterfield; "The Importance of Care in Mechanical Handling of Bituminous Materials for Penetration Macadam and Surface Treatments," by William E. Worcester; "Rock Asphalt and Its Place Among Paving Materials of Today." by W. A. Brownfield, "Suggested Organization of the Engineering Departments in Small Cities," by Harry Tucker.

Tuesday afternoon reports of specification committees will be presented and discussed. Also reports of representatives in other organizations. The latter include several committees of the American Society for Testing Materials, The National Research Council, the United States Department of Commerce, Division of Simplified Practice, American Engineering Council, and American Engineering Standards Committee. Tuesday evening will be open for a continuation of the afternoon session, if necessary.

WEDNESDAY SESSIONS

Wednesday morning Major C. H. Brown will read a paper on "City Planning in Washington, D. C." Other papers will be: "Pavement Design in Relation to Traffic Movement, " by E. A. Fisher. "The Liberty Plan," by Van Ness Bates; "Directed Recreation," by F. O. Eichelberger; "Parks and Playgrounds," by G. A. Parker; "Practical City Engineering," by E. R. Kinsey; "Municipal Finance," by C. C. Pashby; discusion to be opened by James R. Pollock; "Financing, Rental and Amortization of Private Sewerage System at Troy, Pa." by Henry W. Taylor.

Wednesday afternoon: "Notes on Charges for Sewage Disposal," by Samuel A. Greeley, discussion to be opened by Geo. G. Earl; "The Washington Surburban Sanitary District," by Robert B. Morse; "Separate Sludge Digestion," by Jerry Donohue; "Results on Separate Sludge Digestion Experiments Made During the Last Year," by William Rudolfs; "The Problem of Concrete Deterioration, More Especially with Reference to Its Use for Conduits and in Lining Iron Pipes," by John R. Baylis; "Microscopic Life in Texas Waters," by John B. Hawley: "The Natural Hunger of Human Beings for Wholesome Self Expression," by Eugene T. Lies. Wednesday evening will be devoted to social entertainment.

THURSDAY SESSIONS

Thursday morning will be the joint session with the Asphalt Association.

For program, see the October issue of PUBLIC WORKS.

Thursday evening will be open for miscellaneous papers, reports, etc.

The Advance Program contains the reports of several of the committees, including some of the specification committees and representatives in other organizations. The committees on specifications for sewers and for brick pavement have no changes to recommend. The committee on stone block pavement has redrafted the specifications for these pavements, embodying in the new form several amendments and corrections which have been adopted by the society since 1920, when the existing specifications were adopted.

The organizations concerning which representatives report include the Highway Research Board, The Division of Simplified Practice of the U. S. Department of Commerce, dealing with standard manhole frames and covers, and with grades of asphalt; The American Engineering Council; The American Engineering Standards Committee; The American Society for Testing Materials; and The International Conference on City Planning.

ROAD BUILDERS CONVENTION AND ROAD SHOW

It is expected that the 1927 Convention and Road Show of the American Road Builders' Association, which will be held in Chicago during Good Roads Week, Jan. 10-14 inclusive, will eclipse all previous gatherings of the association.

The Road Show will be held in the Coliseum as usual but the Convention and headquarters this year will be at the New Palmer House, where larger rooms are available for the meetings and banquet. Official headquarters will be opened Dec. 10, 1926.

The chairman of the Program Committee is H. K. Bishop of the Bureau of Public Roads and he has assisting him S. M. Williams of the Autocar Co., in charge of the Contractors' Program; and Mr. Paul Tebbs of the Pennsylvania State Highway Department in charge of the Engineers' Program.

Already the applications for space have exceeded that of last year, when approximately 300 carloads of the latest improved road building machinery and materials were on exhibition.

Reduced railroad fares will be granted to all members of the American Road Builders' Association and their families. Previously the railroads had granted reduced fares to all delegates but this year it is granted only to members. Detailed methods of securing reduced fares will be furnished all exhibitors and those that registered last year.

The Bureau of Public Roads has planned a novel exhibit, both interesting and educational, for the Coliseum and also for the Palmer House, adjacent to the convention meeting rooms. In this location at the Palmer House the Association of State Highway Officials, Highway Research Board, several State Highway departments—and some of the Pan-American countries will also have exhibits. Several technical associations will be invited to exhibit at this technical and educational exhibit.

With the advantages of an exposition of the latest improved road building machines and a convention presenting the latest methods, all of which can be attended in four days, it is hoped that the several states, counties and cities will send many delegates in order that they may keep pace with the latest methods which are shown at this, the greatest exposition of its kind in the world.

Detailed or additional information may be had from the Business Director, Chas. M. Upham, Raleigh, N. C.

TENNESSEE BRANCH, ASSOCIATED GENERAL CONTRACTORS

The Tennessee Branch of the A. G. C., at a convention held at Nashville, elected as president V. E. Schevenell of Memphis, as vice-president J. E. Garvin of Knoxville, and as Treasurer, A. W. Atwater of Chattanooga.

INTERNATIONAL CITY MANAGERS' ASSOCIATION

This association held its annual meeting at Colorado Springs, September 21-23. It elected Fred H. Locke, city manager of Grand Rapids, as president; and as vice-presidents, elected A. M. Wilson, of Colorado Springs, T. S. Scott of Niagara Falls, Ontario, and E. E. McAdams of Waco, Texas. Dubuque, Iowa was selected for the 1927 convention.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The fall meeting of this society was held at Philadelphia, October 4th—9th with nearly 1150 members and guests registered. Technical meetings were held each morning, with afternoon and evening devoted to entertaining and social features.

After general meetings on the first two mornings, the second devoted to a general review of 150 years of engineering, separate meetings were held by the several technical divisions. Those of special interest to our field were held by the Sanitary Division. On Wednesday there was a review of 150 years' progress along several lines, that in waterworks being given Geo. W. Fuller, in sewerage by Harrison P. Eddy, in refuse by Samuel A. Greeley, in land drainage by S. H. McCrory, and ventilation by Dr. Geo. T. Palmer.

On Thursday morning there was a symposium on industrial wastes, introduced by W. L. Stevenson, with papers on Oil Refinery Wastes by Robt. Spurr Weston; Coal Mine Drainage by Andrew B. Crichton; Pulp and Paper Mill Wastes by Geo. K. Spence; and Tannery Wastes by Wilhelm Howalt.

The division on city planning devoted its time largely to the discussion of four papers which had already been printed, many written discussions having been sent in and considerable oral discussions being given from the floor. Its meetings were held jointly with the American City Planning Institute.

Prior to this meeting, the Board of Directors met, awarded the several medals and prizes for papers, adopted resolutions of regret for the death of Desmond FitzGerald and Alfred Craven; acted upon 331 applications for admission and transfer, appointed a special committee to investigate and take appropriate action concerning the inadequate compensation of engineers in municipal service with the resulting injurious effect upon the quality of municipal engineering, and took other actions. The medals awarded were as follows: Norman Medal to Julian Hinds, for his paper "Side Channel Spillways; Hydraulic Theory, Economical Factors, and Experimental Determination of Losses." The J. James R. Croes Medal to C. S. Jarvis for his paper on "Flood Flow Characteristics." The Thomas Fitch Rowland Prize to Nicholas S. Hill, Jr. for his paper "The Oradell Dam of the Hackensack Water Company." The James Laurie Prize to Lewis A. Perry, for his paper "A Hexagonal Slab Design of Concrete Pavement." The Arthur M. Wellington Prize to Col. Chas. W. Kutz for his paper "Relation of the Ohio River and its Tributaries to Transportation in the United States." The Collingwood Prize for juniors to Cecil Vivian von Abo for his paper "Secondary Stress in Bridges."

PERSONALS

Desmond Fitz Gerald, past president of the American Society of Civil Engineers, honorary member and past president of the New England Water Works Association and for years one of the country's most prominent water works engineers, died on September 22nd, aged 80 years.

C. E. Swank (of the recently dissolved Swank-Tanner Engineering Co.) has been appointed city manager of Lake City, Fla.

Alfred Craven, formerly chief engineer and later consulting engineer of the New York City Public Service Commission, and in 1916 vice-president of American Society of Civil Engineers, died at his home at Pleasantville, N. J. on Sept. 30, aged 80 years.

Washington Jenkins, for many years city engineer of Ogden, Utah, died in that city October 10th, aged 69 years.

Chester C. Oberleas, county surveyor of Hamilton County, Indiana, has been appointed city engineer of Indianapolis.

Frank C. Emerson, state engineer of Wyoming, has been nominated for governor of that state.

NEW CATALOGS

SWIMMING POOL WATER

Wallace & Tiernan Co., Newark, New Jersey. A 32-page pamphlet, charmingly illustrated, showing swimming pools using water purified by W. & T. apparatus.

STEAM PURIFIER

Andrews Bradshaw Co., Pittsburgh, Pa. A 48-page catalogue describing the "Tracyfier," a steam purifier and gas and vapor scrubber. Fully illustrated.

SULLIVAN MACHINERY COMPANY

Sullivan Machinery Co., Chicago. "Handy Hoisting and Hauling" describes with numerous illustrations uses of the "Turbinair" steam and electrical portable hoist. 16 pages. "Speed up With Air" shows, with numerous illustrations and brief descriptions, various uses of compressed air. Bulletins are published describing apparatus for each of these several uses.

KOEHRING CONSTRUCTION MIXERS

The Koehring Company, Milwaukee, Wis. A catalogue of 48 pages giving detailed descriptions and illustrations of complete line of heavy-duty mixers from 10 S to 28 S.

SANITARY SEWERS

The W. S. Dickey Clay Mfg. Co., Birmingham, Ala. A 160 page book describing advantages of sewage systems, giving instructions for city officials and engineers in obtaining systems, and explaining advantages of vitrified clay pipe.

AUTOMATIC DRAINAGE GATES

The California Corrugated Culvert Co., Los Angeles, Calif. Illustrations and descriptions of various uses of Calco Automatic Drainage Gate. 12 pages.

QUICK HARDENING CONCRETE

The Universal Portland Cement Company, Pittsburg, Pa. Two 4-page folders describing a method of obtaining high-strength concrete in three days.

MAPS AND CHARTS

W. & L. E. Gurley, Troy, New York. A 22 page booklet explaining the organization and activities of the Board of Surveys and Maps of the Federal Government.

GALION ROAD MACHINERY

The Galion Iron Works Mfg. Co., Galion, Ohio. Five catalogues describing the Galion Master 4-cylinder motor roller, tandem 4-cylinder motor roller, International motor roller, "EZ Lift" motor grader, and "Standard" motor grader.

BUHL AIR COMPRESSORS

The Buhl Company, Chicago, Illinois. Three recent bulletins describing complete line of portable and stationary compressors

However storms may interfere with travel, telephone operators are at their posts

An Unfailing Service

AMERICANS rely upon quick communication and prove it by using the telephone seventy million times every twenty-four hours. In each case some one person of a hundred million has been called for by some other person and connected with him by means of telephone wires.

So commonly used is the telephone that it has come to be taken for granted. Like the air they breathe, people do not think of it except when in rare instances they feel the lack of it.

Imagine the seventeen million American telephones dumb, and the wires dead. Many of the every-day activities would be paralyzed. Mails, telegraphs and every means of communication and transportation would be overburdened. The streets and elevators would be crowded with messengers. Newspaper men, doctors, policemen, firemen and business men would find themselves facing conditions more difficult than those fifty years ago, before the telephone had been invented.

To prevent such a catastrophe is the daily work of three hundred thousand telephone men and women. To maintain an uninterrupted and dependable telephone service is the purpose of the Bell System and to that purpose all its energy and resources are devoted.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

OIL-ELECTRIC LOCOMOTIVE

The Ingersoll-Rand Company, New York City. "Clearing the Way for the Comforts of Life." An artistic 16-page pamphlet briefly tracing the history of locomotion up to the Oil-Electric locomotive, in the development of which this company was a pioneer.

CELITE FOR CONCRETE

The Celite Products Company, Los Angeles, California. A 16-page bulletin describing the use of Celite as an admixture in concrete, laboratory tests, direction for use, etc.

ASPHALT HEATERS

The Kinney Mfg. Co., Boston, Mass. 44-page pamphlet describing the Kinney heater and distributor, asphalt and tar pumps, loading pumps, hand spraying pumps, street flushers, etc.

BAKER SNOW PLOWS

The Baker Mfg. Co., Springfield, Ill. A handsome 48-page catalogue, just published, describing snow plows for use with motor trucks and tractors.

LUBRICATING CLIMAX ENGINES

The Climax Engineering Company,

(*Continued on page 44*)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

STREET ICE LEVELER

The Gifford-Wood Co., of Hudson, N. Y. manufactures the Eureka Street Ice Leveler which is said to be used by many municipalities for ripping up the ice and frozen snow on city streets, and by street car companies for cutting down the ice between car tracks so that there will be sufficient clearance for the motor boxes. The leveler travels on two runners which can be set to ride on the car rail, or independent of the rail. The machine is operated by two men, two hand wheels allowing them to lower the runners, thereby giving more bite to the teeth when desired. If necessary, the runner on either side of the machine can be lowered to give the cutting bar the proper tilt when on a sloping surface. The machine may be drawn by horses or tractors, or motor trucks.

EUREKA STREET ICE LEVELER

An important part of the leveler is the teeth used, which are made from the finest quality tool steel tempered with great care to withstand the severe usage. The teeth must be sharpened from time to time and not be allowed to become dull, else they will not feed down below the ice surface. These teeth are also furnished separately for use on snow plows and other appliances for loosening snow or ice.

STOCKLAND WHIPPET

The Stockland Road Machinery Company, Minneapolis, Minn., manufactures a Whippet grader which it claims to be the only one-man power patrol of its kind on the market of the pull type. It is said to be attachable to practically any type of tractor on the market, and is instantly detachable from the tractor. Big reduction gears and cam auxiliary spring lift makes the hand wheel easy to work. Blades 14½ inches wide are furnished either 7¼, 8 or 10 feet long. The blade lifts eleven inches above the ground and has a lateral shift of 20 inches, and pitch adjustment of 3 inches. A scarifier is furnished when desired, weighing 300 pounds, with nine teeth 1x2x13 inches.

The grader can be turned in twenty feet of space. It can be furnished with either self-cleaning steel wheels with removable cast iron boxes, or with self cleaning steel wheels with Hyatt heavy-duty roller bearings or Hyatt bearings with patent quick replacement device manufactured by French & Hecht, rubber tired.

THREE WAY DUMP BODY

The Differential Steel Car Company, Findlay, Ohio, manufactures a dump body which can be made to dump to the right or left or rear by merely setting the control lever in the proper notch. To dump to the left, the control lever is set in the proper notch and this slips the locking pins into their bearings along the left side of the body, thus hinging it to the frame on the left side and leaving the right side free to rise. Power from the motor is supplied through the propeller shaft and bevel gears to the screw, which tilts the body to the proper angle and then stops automatically. As the body tilts to the left, the left-side, which is hinged at the bottom, opens automatically until it is in line with and forms an extension of the floor, thus throwing the material clear of the wheels. To dump to the right hand is merely a reverse movement of the left hand operation. For rear dump the lever is shifted to the rear notch, and left and right hand pins are released while the rear pins are engaged.

The hoisting mechanism consists of a telescoping screw driven by bevel gears which are connected by a propeller shaft to the power takeoff of the motor. It is claimed that this screw will raise a five-ton load with ease. The screw is equipped with ball and socket joint at each end, allowing it to adjust itself to lifting the body to either side or to the rear.

NEW HARNISCHFEGER EXCAVATORS

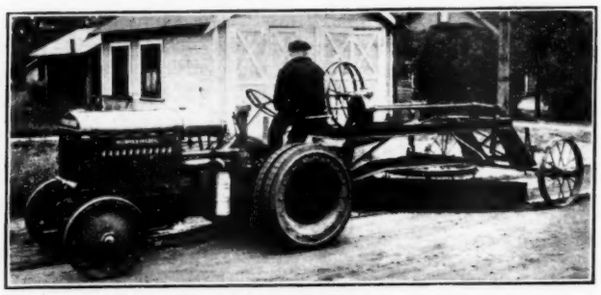
The Harnischfeger Corporation, Milwaukee, Wisconsin, announces a complete new line of excavators built in ½, ¾, 1 and 1¼ cubic yards capacity. These are all steel from the tip of the boom to the corduroy shoes. The revolving frame, car body, drum side stands, etc., are heavy one-piece steel castings. It is claimed that these excavators have less tail swing than any other machine of similar capacity, which permits them to work in narrow alleys or other confined places. Concerning the crowding motion the manufacturers state that it is positive and will bite into the toughest soils; that it can force the dipper above the boom point, which is valuable in loading trucks on top of a bank; that it is independent of the hoisting, which permits cutting a level floor or any slope of bank; that the dipper can be reversed rapidly so as to shake off sticky soil; that there are no air or steam engines on the boom or cables to wear out; and that full power of the motion can be thrown into the crowd.

Like other P. & H. models, these can be used as a shovel, skimmer scoop, hoe, dragline, pile driver, clamshell and crane, the change from one model to another being made quickly by means of a patented drum spider and lagging.

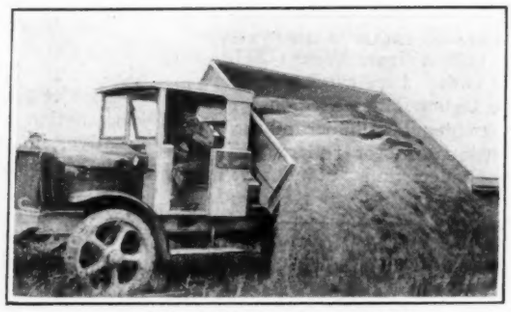
NEW OSGOOD SHOVEL

The Osgood Company, Marion, Ohio, has recently placed on the market a 1¼ yard gasoline or electric shovel for contractors desiring one larger than their 1-yard shovel. The machine is designed to give efficient service not only as a shovel but also as a crane, with hook block or clamshell bucket and as a dragline excavator, without any changes or additions to the operating machinery, but only to the booms and buckets. Only four friction clutches are used in the usual operation of the machine, these being of the outside contracting band type.

The standard mounting is on an enclosed gear drive continuous tread truck of simple and rugged design. The chief features of construction are the all gear drive with enclosed gears run-

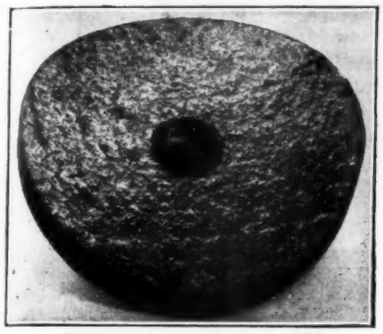


STOCKLAND WHIPPET SCRAPER ATTACHED TO TRACTOR



THREE-WAY DUMP BODY

The Error Of Making The Exception The Rule



OUTSIDE OF CAST IRON PIPE
USED 31 YEARS

Specimen cut from 36-in. main laid in October, 1893, in 75th St. at Yates Ave., showing the shiny surface of coating intact

Flow Tests of Old Cast-Iron Water Mains, Chicago Water-Works

Pipe in Use 9 to 36 Years Show Low Friction Loss and That Coefficient Should Be Based on Corrosivity of Water

BY J. B. EDDY
Engineer, Water Pipe Extension Division, Chicago Water Department

INSIDE OF CAST IRON PIPE
USED 35 YEARS

Cut from 12-in. main laid in April, 1889, in Roosevelt Road at Troy Street. No deep tuberculations were found

IN THE design of cast-iron feeder mains the most important factor to be considered is the friction coefficient, C. If too high a coefficient is used in computations there will be an excessive loss of head when the main is worked to capacity, resulting either in low pressure to the consumer or waste of power at the pumping station in order to carry a high pressure to compensate for the friction loss. If too small a coefficient is used money may be wasted in laying a larger main than is actually needed. The tendency in the past has been to err in using coefficients too low, as many standard tables in common use have been constructed that provide for a definite increase in loss of head with the age of the pipe. While this error has been on the side of safety, as far as carrying capacity is concerned, it may cause a needless expenditure of money. (See Art. 116, Merriman's "Treatise on Hydraulics.")

Experience has shown that whether or not there is an increase in friction head with age depends entirely upon the quality of the water conveyed. In some localities where extremely soft waters are found tuberculation will occur and unless steps are taken to clean the pipe lines with some degree of regularity high friction heads will ultimately result. In other places tuberculation is entirely absent and after years of service the interior of the pipe is approximately in the same condition as when first laid.

Cast-iron mains in the Chicago water system are typical of the latter class. Examinations and test indicate that age has little or no effect on their carrying capacity.

The tabulation that follows shows the results of some of the tests made over a period from 1907 to date.

As a result of these tests and examinations made by the Chicago Water Department, it is customary in figuring pipe sizes for feeder mains to assume that the pipe coefficient will not change with age.

TYPICAL FRICTION LOSSES IN CAST-IRON MAINS, CHICAGO WATER-WORKS

Tests Made from 1907 to 1925 by Water-pipe Extension Division, Chicago Water Department

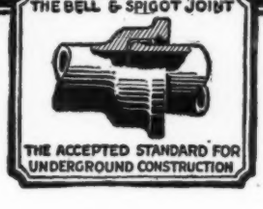
Location	Diameter, Inches	Years of Service	Length, Feet	Results Shown by the Tests: Velocity Ft. Per Sec.	Loss of Head, Ft.	Coef. in Chezy Formula	Coef. in Hazen & Williams Formula
66th St. and Stony Island Ave. to 51st St. and Harper Ave.	36	9	10,900*	5 33	18 3	150	152 6
67th St. and Stony Island Ave. to Cottage Grove Ave.	48	10	5,300	5.4	6 1	159	158 3
Oglesby Ave. and 68th St. to Stony Island Ave. and 67th St.	48	10	5,300†	7 0	11 8	149	143 0
66th St. and Cottage Grove Ave. to 66th St. and State Street	36	24	6,415‡	4 12	8 24	133	136 7
67th St. and Cottage Grove Ave. to 67th St. and State Street	30	30+	4,950	5 3	12 53	133	136 2
Oak St., Clark St. to Cambridge St.	24	25+	2,830	2.61	2 81	117	138 1
51st St., Wabash Ave. to Halsted St.	20	15	5.470	3 21	8 68	125	137.5
67th St. and Cottage Grove Ave. to 67th St. and State Street	16	30+	5,250	3.89	14.3	130	143 4

*Two right-angle bends in line. †One right-angle bend in line. ‡ Four right-angle bends in line.

Address: RESEARCH ENGINEER
THE CAST IRON PIPE PUBLICITY BUREAU, PEOPLES GAS BUILDING, CHICAGO

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request



Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

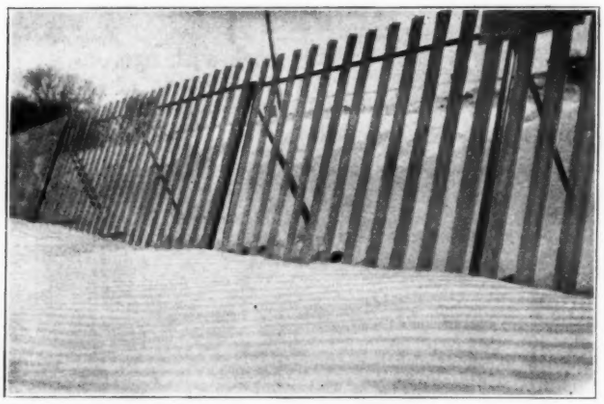
OSGOOD 1¼ YARD GASOLINE SHOVEL

ning in heavy oil; large supporting area of tread belts, steering from the upper body, in any position, with ability to turn gradually or on the machine's own centre axis; and an underside clearance of 12 inches. The shovel crowding is accomplished by a wire rope mechanism. The boom and handle are of combination oak and steel. The combination gasoline tank and counter weight is made of cast iron and as an integral part of the machine. The tank has a capacity of 75 gallons. The gasoline engine is a special Osgood 6 cylinder.

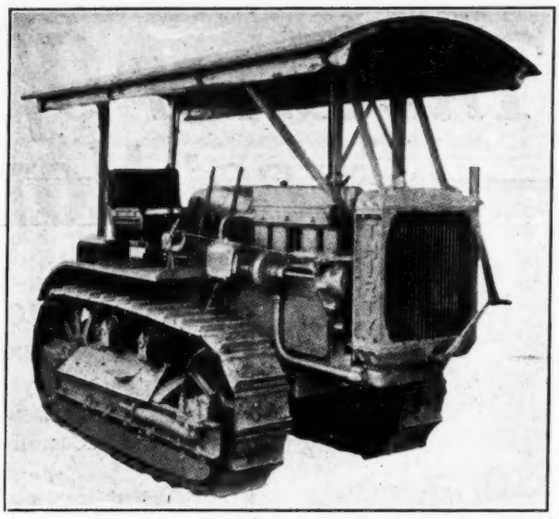
AN ALL METAL SNOW FENCE

The Metalvane Snow Control Corp., Sioux Falls, S. D., manufactures a snow fence, the slats of which consist of V-shaped vanes of metal, 3 inches wide, with 3-inch spaces between. The theory is that the wind strikes the faces of the vanes, is deflected across the openings where it slows down but does not stop directly behind the units. As a result, the snow clears the units and drifts just behind them. The units are said to be self-cleaning and not to clog with snow. The fence is portable and can be carried in sections in a truck and placed wherever necessary according to the prevailing wind, to protect cuts and other points subject to drifts.

Sections 12 feet long and 4 feet high are made using 1" x 1" x ⅛" angles of galvanized metal, the V-shaped sections giving them strength to resist bending while handling. Each unit folds to less than three inches in thickness for storage, and weighs seventy pounds. A wrench and hammer are the only tools necessary for erection or knocking down.



METALVANE SNOW FENCE



CATERPILLAR "THIRTY" TRACTOR WITH HIGH SEAT

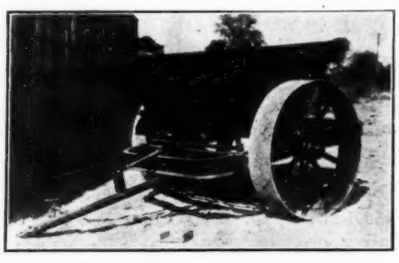
CATERPILLAR THIRTY TRACTOR

The Caterpillar Tractor Company, San Leandro, Calif., announces that a new Model 30 Caterpillar with a high driver's seat is now in production at the San Leandro plant. Greater operative visibility and increased driving ease are claimed for the new design. The company will continue, however, to manufacture the lower-seated model, owing to the demand of orchardists and others for more clearance where overhead obstacles require plenty of head room for the operator.

Following a combination of the Best and Holt Companies, the company announced that prices would be lowered, and they now state that the new scale cuts the prices from 5 to 12%.

WELDED STEEL DUMP TRAILER

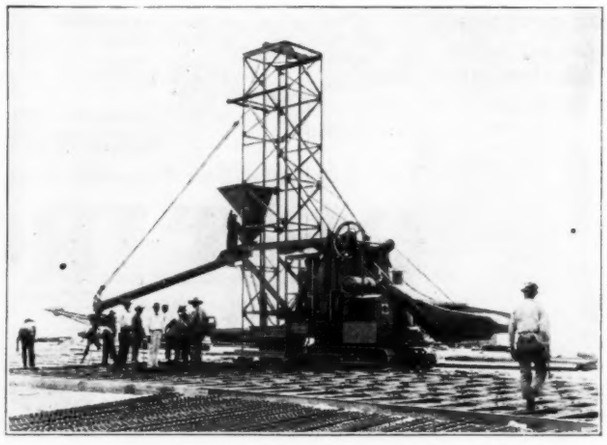
A new type of heavy-duty pump trailer has recently been brought out by the Euclid Crane & Hoist Company, Euclid, Ohio. It is designed for one-man operation behind a tractor, and the two-wheel type of construction permits rapid movement over any kind of ground. The body is made watertight for the carrying of garbage or of grout, electric welding being used for this purpose. Electric welding is used also in place of riveting on the frame to avoid the possibility of loose rivets. The type of welded joint used was developed through co-operation with the Research Department of the Lincoln Electric Company and by field service tests.



WELDED STEEL DUMP TRAILER

PORTABLE CENTRAL MIXING PLANT

J. W. Zempter & Company, of Galveston, Texas, has been using a portable mixing plant which was built by equipping a Smith 27 E paver with a special tower, elevating bucket and hopper for chuting concrete to any point desired from different locations. The illustration shows the equipment pouring the Galveston causeway, the extreme length of which made the portability of the plant desirable. The

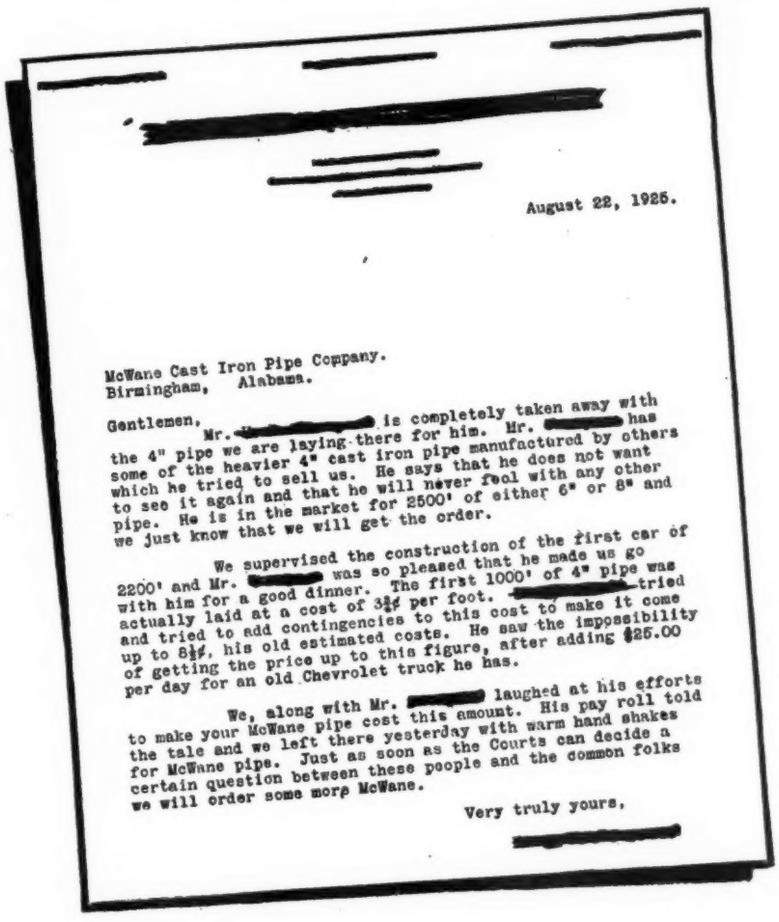


PORTABLE CENTRAL MIXING PLANT

McWANE CAST IRON PIPE precalked

with the Factory-Made Joint

"Laid at a cost of 3¾c a foot—"



August 22, 1925.

McWane Cast Iron Pipe Company.
Birmingham, Alabama.

Gentlemen,

Mr. [redacted] is completely taken away with the 4" pipe we are laying there for him. Mr. [redacted] has some of the heavier 4" cast iron pipe manufactured by others which he tried to sell us. He says that he does not want to see it again and that he will never fool with any other pipe. He is in the market for 2500' of either 6" or 8" and we just know that we will get the order.

We supervised the construction of the first car of 2200' and Mr. [redacted] was so pleased that he made us go with him for a good dinner. The first 1000' of 4" pipe was actually laid at a cost of 3¾¢ per foot. [redacted] tried and tried to add contingencies to this cost to make it come up to 8½¢, his old estimated costs. He saw the impossibility of getting the price up to this figure, after adding $25.00 per day for an old Chevrolet truck he has.

We, along with Mr. [redacted] laughed at his efforts to make your McWane pipe cost this amount. His pay roll told the tale and we left there yesterday with warm hand shakes for McWane pipe. Just as soon as the Courts can decide a certain question between these people and the common folks we will order some more McWane.

Very truly yours,

[redacted]

says this merry writer

Here's a jolly good letter that will make you laugh—and think.

Note that this McWane user says "he will never fool with any other pipe." Note how he tried his darndest to prove that the cost of laying the first 1000 feet was more than 3¾ cents per foot!

And last but not least—the McWane representative got a good dinner—so pleased was the customer.

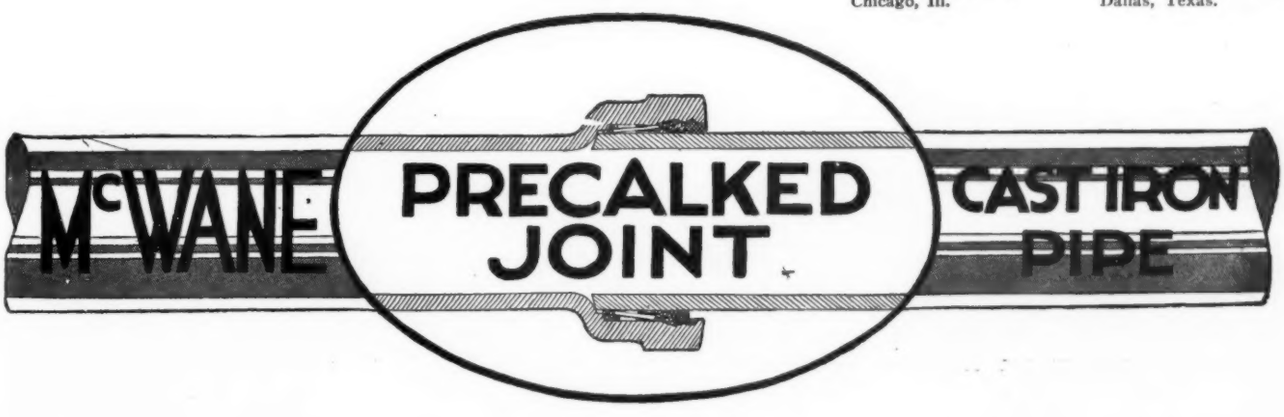
It is just this way that McWane Precalked Joint Cast Iron Pipe has carried conviction to users in 48 states where now over 10,000,000 feet have been installed.

It will pay you to investigate this pipe with the factory-made joint. *Write our nearest office.*

McWANE CAST IRON PIPE COMPANY
Birmingham, Ala.

District Offices:

819 Bankers Tr. Bldg., Philadelphia, Pa.
422 Central Bldg., Los Angeles, Calif.
208 S. La Salle St., Chicago, Ill.
1807 Sante Fe Bldg., Dallas, Texas.



boom and bucket were removed when the tower was attached but can be replaced for road paving work.

FULL CRAWLER CO. DISTRIBUTOR

The Full Crawler Company, Milwaukee, Wis. announces the appointment of the B. Hayman Co. Inc., 148 North Los Angeles St., Los Angeles, Calif., as its new destributor of Trackson Full-Crawlers. The Hayman Company will cover the territory formerly handled by the O. R. Peterson Co. and carry a complete lot of crawlers and repair parts.

ORGANIZATION FOR GRECO SUPERHEATER

J. A. Connell, Jr. superintendent of streets of Camden, N. J., stated that in removing and relaying the surface of 1,600 square yards per day of asphalt pavement by the surface heater method, using a Greco Superheater, the force employed consisted of a foreman, heater engineer, roller engineer, 6 rakers, 15 laborers and 2 watchmen at a cost of $93 a day; a steam roller at a cost of $25, and two five-ton trucks at a cost of $50. The material used consisted of 54 tons of surface costing $172.80, 250 gallons of fuel oil costing $17.50, and incidental repairs, etc. $50; giving a total cost of $408.30. which averages $0.25½ per square yard. This does not include supervision, or depreciation of equipment, or overhead on any part of the work.

BARBER GREENE DITCHER

The Barber Greene Company, Aurora, Ill., has brought out a 4-inch ditcher which is of the same construction as the standard ditcher except that it has a special vertical boom cutting 4 inches wide and 18 inches deep. The illustration shows one of these ditchers working for the Outdoor Lighting Company of Chicago, at Elmhurst, Ill., where it cut 1,000 feet an hour several times and often 7,000 ft. in a day, the ditch being for laying a conduit for ornamental lights.

BARBER-GREENE DITCHER

LINK BELT REPRESENTATIVES

The Link Belt Company, Chicago, has opened a branch office in Utica, N. Y. at 107 Foster Building, 131 Genesee Street, to be devoted especially to the sale of Link Belt Silent Chains and Roller Chains. It will be in charge of F. B. Hermann, Jr.

The company has also arranged for Gilbert H. Unruh to represent it in Baltimore. For the present he may be reached at 618 Regester Avenue, Stoneleigh, Baltimore Co., Md.

PATENTED BUILDING FOR PARKING AUTOMOBILES

A type of building designed especially for parking large numbers of automobiles has been designed and patented by Samuel C. Lancaster and Christian O. Hjermstad, which is called the Lancaster System of Spiral Floor Buildings; the inventors having retained Condron & Post of Chicago as consulting and designing engineers. The general principle is that of a spiral floor extending continuously through the center of a building from the ground to the roof, with parking spaces at each floor level around the four sides. Plans contained in an advertising folder show a building 115 feet square with a capacity of 51 cars per story, or 510 cars for 10 stories in height. A car can be driven by its owner to parking space and he may then return by elevator to the ground floor.

WESTINGHOUSE STREET LIGHTING ENGINEER

The Westinghouse Electric & Mfg. Company has appointed T. C. Randall as Street Lighting Engineer in the Buffalo territory, with headquarters at the Buffalo office of the company. Mr. Randall entered the employ of the Westinghouse Company at the Syracuse office in 1922, became chief correspondent of that office in 1924, which position he held until transferred to the Buffalo office.

PORTLAND CEMENT ASSOCIATION

The Portland Cement Association announces the following appointments in its General Office staff, effective October 1st: C. R. Edge, Manager of Advertising and Publication Bureau, succeeding H. C. Campbell, resigned; G. S. Eaton, Assistant Manager, Advertising and Publications Bureau; W. E. Hart, Manager Highways and Municipal Bureau (formerly Highways Bureau); F. R. McMillan, Manager Structural and Technical Bureau (formerly Structural Bureau); T. J. Harris, Manager General Educational Bureau.

SPEEDER MACHINERY CORP.

The Speeder Machinery Corp., Fairfield, Iowa, announces that it will soon remove its factory and general offices to Cedar Rapids, Iowa, where it is building a new modern plant which it expects to occupy not later than January 1st, 1927. The new plant has increased capacity and the location offers a greater labor market with improved shipping arangements.

The company announces recent appointment of district sales representatives as follows: H. E. Parsons, Pacific Coast District; R. E. Coop, Southwestern District; W. H. Boyd, Southern District; L. A. Bartlett, Eastern District. It has also opened a sales and service office at 90 West Street, New York City, in charge of D. W. Lehti, who will have charge of Eastern New York and New England territory

NEW CATALOGS

(*Continued from page 39*)

Clinton, Iowa. 26-page revised edition of treatise on "Lubrication for Climax Trustworthy Engines."

ASPHALT RESURFACING

The Texas Company, New York City. Illustrated booklet describing "Resurfacing Worn Brick and Block"; "Resurfacing Worn Macadam and Gravel"; "Texaco Cold Patch"; and "Texaco Paving Filler."

ARMCO CULVERT ANNIVERSARY

Armco Culvert & Flume Mfrs. Assn., Middletown, Ohio. 16-page illustrated pamphlet calling attention to the fact that 1926 is the thirtieth anniversary of the invention of the corrugated iron culvert.

ELECTRIC ARC WELDING

The Lincoln Electric Co., Cleveland, Ohio. A 24-page illustrated bulletin describing the procedure and uses of automatic arc welding.

THE STERLING DESTRUCTOR

The C. O. Bartlett & Snow Co., Cleveland, Ohio. 24-page bulletin describing and illustrating this destructor and many of its installations.

TRUSCON BUILDING PRODUCTS

The Truscon Steel Company, Youngstown, Ohio. A 28-page catalogue of steel sash, windows, garage doors, lath and other building products manufactured by that company.

ELECTRIC LIGHTING

The Edison Lamp Works, Harrison, N. J. A 40-page pamphlet describing theory and characteristics of Mazda Lamps; also a 35-page pamphlet giving instructions for calculating lighting installations, either indoor or outdoor.

SNOW FENCE

The Good Roads Machinery Company, Kennett Square, Pa. 15-page illustrated pamphlet describing the Good Roads snow fence, its construction and use.

DORR SANITARY EQUIPMENT

The Dorr Company, New York City. 16-page pamphlet describing use of Dorr clarifiers, screens, sludge pumps and other appliances for use in sewage and water purification systems.

NEWS OF THE SOCIETIES

Dec. 2-3 — HIGHWAY RESEARCH BOARD, NATIONAL RESEARCH COUNCIL. Sixth Annual meeting at Washington, D. C.

Jan. 10-11 — INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS. Annual meeting at St. Louis, Mo.

Jan. 10-14 — AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago, Ill.

Jan. 17—AMERICAN INSTITUTE OF CONSULTING ENGINEERS. Annual meeting in New York City.

Jan. 17-19—NATIONAL SAND AND GRAVEL ASSOCIATION. Eleventh annual convention at Cincinnati, O.

Jan. 19-21—KENTUCKY-TENNESSEE SECTION, A. W. W. A. meeting at Memphis, Tenn.

Jan. 19-21—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting in New York City.

Feb. 16-18—ASSOCIATION OF STATE HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES. Third annual convention at Atlantic City, N. J.

June 6-11 — AMERICAN WATER WORKS ASSOCIATION. 47th annual convention at Chicago, Ill.

HIGHWAY RESEARCH BOARD

The sixth annual meeting of the Highway Research Board of the Division of Engineering and Industrial Research, National Research Council, will be held in Washington, December 2nd and 3rd. Among the committees which will present reports will be those on the Economic Theory of Highway Improvement, T. R. Agg, chairman; Structural Design of Roads, A. T. Goldbeck, chairman; Character and Use of Road Materials, H. S. Mattimore, chairman; Highway Traffic Analysis, G. E. Hamlin, chairman; Highway Finance, H. R. Trumbower, chairman; Maintenance, W. H. Root, chairman. Also progress reports on Culvert Investigations by R. W. Crum, and on Low Cost Improved Road Investigation by C. N. Conner. A paper on The methods and Possibilities of Road Soil Investigations will be read by Charles Terzaghi. There will also be addresses by T. H. MacDonald and George K. Burgess.

ASSOCIATED GENERAL CONTRACTORS

The Florida Branch of the A. G. C. has elected the following officers: President, E. D. Kenyon, Orlando; vice-president, Charles E. Friend, Tampa; secretary-treasurer, R. G. Church, Tampa. Directors, E. D. Kenyon, Charles E Friend, W. A. Snow, R A. Wilson, G. T. Wright, and W. T. Hadlow.

A Tennessee Branch of the Association has recently been formed with the following officers: President, V. E. Schevenell, Memphis: vice-president at large, J. E. Garvin, Knoxville; treasurer, A. W. Atwater, Chattanooga. Directors: Dave Brandon and L. C. Smallwood, Chattanooga; O. M. Dunn, and A H. Whisman, Knoxville; J. A. Angus and W. C. Owen, Memphis; J. W. N. Lee, and C. C. Wilson, Nashville

ASPHALT ASSOCIATION

The fifth annual asphalt paving conference under the auspices of the Asphalt Association was held in Washington, D. C., November 8th-12th. About 350 attended the conference, which lasted through Tuesday, Wednesday and Thursday morning.

On Tuesday papers were presented as follows: "Causes of Success and Failure of Bituminous Macadam Pavement" by G. H. Henderson, state highway engineer of Rhode Island, discussed by S. C. Fitch; "Asphalt Macadam Mixing Methods" by R. M. Smith, chief engineer of the Ontario Provincial Highway Department; "Cold Application and Cold Patch for Surface Treatment" by W. E. Catchings, formerly construction engineer of the North Carolina Highway Department; "Surface Treatment by Hot Application Method" by N. S. Anderson, maintenance engineer of the South Carolina Highway Department.

Tuesday afternoon session opened with an address by Hon. George H. Moses entitled "Basic Policies Which Should Govern Highway Improvements," which was listened to by the members of the American Society for Municipal Improvements as well as the Asphalt Paving Conference. This was followed by discussions on subjects of special interest to contractors, including "Should Paving Contractors Be Licensed?" and "Cost of Incompetent Inspection to Contractor and Owner."

Wednesday's papers included "Adaptation of City Pavements to Country Highways" by E. E. Butterfield; "Construction of Granite Block Pavements With Asphalt Filler" by C. M. Pinckney, chief engineer of the Borough of Manhattan; "Asphalt Maintenance Without Recourse to Large Plants" by W. E. Rosengarten, traffic engineer with the Asphalt Association; "Development of Asphalt Paving Types in South Park, Chicago," by Linn White, chief engineer of the South Park Commission, Chicago; "Parks and Parkways of Westchester County" by Jay Downer, chief engineer of the Westchester County Park Commission; "Researches on Bituminous Paving Mixtures" by W. J. Emmons, highway research specialist of U. S. Bureau of Public Roads; "The Voidage Theory of Asphalt Paving Mixture Designs in Practice, with Special Reference to Shear Strength Methods of Testing" by Gene Abson, director of the Chicago Paving Laboratory; "Correlation of Stability Test With the Behavior of Pavements Under Traffic" by Prevost Hubbard, chemical engineer and S. B. Steele, chemist of the Asphalt Association; "The Influence of Shape of Sand Grain on the Stability of Asphalt Paving Mixtures" by Victor Nicholson, engineering chemist, Department of Public Works, Chicago; "Gasoline Deterioration Test for Asphalt Paving Mixtures" by Henry L. Howe, Jr., director Municipal Testing Laboratory, Rochester, New York; "Cross Sectional Design of Asphalt Pavements" by A. T. Goldbeck, director, Bureau of Engineering, National Crushed Stone Association.

On Thursday morning there was a joint session of the conference and the A. S. M. I., which is described in the account of the convention of the latter in this issue.

ILLINOIS ASSOCIATION OF HIGHWAY & MUNICIPAL CONTRACTORS

This association will hold its twentieth annual convention and banquet at the Hotel Sherman, Chicago, on December 15th and 16th. The convention will endeavor to drive home to the contractors that they themselves must individually correct the internal weaknesses of the profession, according to the announcement of the convention, which states that "The concensus of opinion among responsible contractors is that the outstanding cause for the

(Continued on page 44)

PERSONALS

Thomas Hugh Boorman died November 15th at his residence at Glen Ridge, New Jersey, aged 76 years. He was formerly editor of Architecture & Builder and was the author of "Asphalts, Their Sources and Uses."

R. Marvin Porter, formerly with the highway department of North Carolina, has been appointed city engineer of Columbia, S. C.

James A. French, state highway engineer of New Mexico, died October 14th.

Carl F. Heintze, contractor and engineer of Sacramento, California, died on October 11th.

Harlan D. Miller, bridge engineer of the California Highway Commission died October 20th. The California Highway Commission has announced that the longest and highest concrete arch in California, now under construction, will be named after Mr. Miller.

V. Bernard Siems, formerly chief water works engineer of Baltimore, has resigned and will be vice-president and general manager of the newly formed North American Water Works Corporation.

T. H. Dennis, formerly highway maintenance engineer of division III of the California State highways, has been appointed acting engineer of maintenance for the state highway commission.

E. C. Dietrich, city engineer of Tucson, Arz., died Oct. 14, aged 45 years.

John R. Baylis, formerly principal sanitary chemist of the Baltimore water department, is now in charge of experimental water purification plant design and construction for the Water Safety Division of Chicago.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

BAY CITY TRACTOR SHOVEL

The Bay City Tractor Shovel, manufactured by the Bay City Dredge Works, Bay City, Michigan, is being announced to the public following a period of exhaustive and severe tests. It is the creative work of John W. Fairbanks, who has previously developed earlier models of tractor shovels.

This machine is built around the International McCormick-Deering tractor, which supplies the motive power and provides three propelling speeds, the fastest of which is 3½ miles an hour, through its selective transmission. All of the operating machinery is located on a revolving bull-wheel which is above the machinery frame. The operator revolves with the machinery, which swings through an arc of 270 degrees. This ¾ circle swing permits full circle utility and part circle economy. The shovel can dig or load opposite the rear end of the crawlers. The machine is built throughout of special steels with alloy shafting; forged, heat treated and machine-cut gears, and Timpken roller bearings. It is equipped with shovel that will make five bucket trips per minute, and with full-length steel crawler treads 9 ft. long with tread rollers inclosed to keep out dirt. The operating machinery, gears and bearings are also enclosed under a removable metal hood for protection from weather and dirt.

The machinery is strictly one-man operated and can be run on kerosene if desired. The shovel boom is 15 ft. long, permitting the shovel to cut at a height of 17 ft. or dump at a height of 15 ft. Crowding, accomplished by means of a steel worm and bronze gear running in oil and connected with the machine by shaft and gears, is reversible and positively self-locking.

The shovel can be quickly converted into a crane, dragling or backfiller by removing the shovel boom and crowd and putting on a 25 ft. crane boom. Power boom hoist mechanism is provided for either shovel or crane. It is built to serve as a light, small and fast convertible excavator for general excavation, loading materials from stock piles, loading or unloading cars, excavating or backfilling small sewer trenches, and particularly house basements.

The dipper capacity is three-eighths cubic yard water level measure, or practically one-half yard heaped. The machine weighs 8 tons and is capable of digging very hard material. Present optional bucket equipment includes shovel, clam shell or backfiller scraper.

This shovel will be sold and serviced by International Harvester Company branch houses as well as by Bay City Dredge Works representatives.

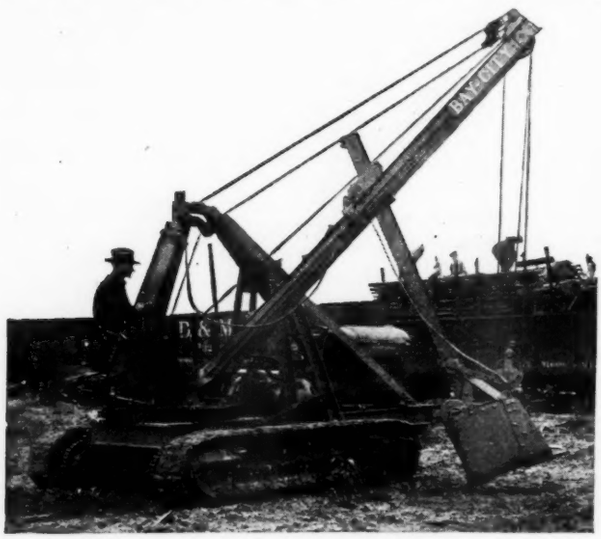
KOEHRING SUBGRADE PLANER

The Koehring Company, Milwaukee, Wis., has, during the past season, developed a subgrade planer which is connected to the paver and moves along automatically as it moves, cutting down the high spots and filling in the low places. Wide wheels on the ends of the planer ride on the road forms and support the frame. Scarifying teeth placed about twelve inches apart are fastened to the frame ahead of the scraper blade so that the rough places are caught by the teeth and then brought down to smooth surface by the blade. Adjustments can be made so that the planer will leave the subgrade with any crown desired. In average light soil the planer will grade efficiently to a depth of two inches, but it is not designed to work in hard clay or in old macadam road beds or those which have shale or rock embedded in large quantities.

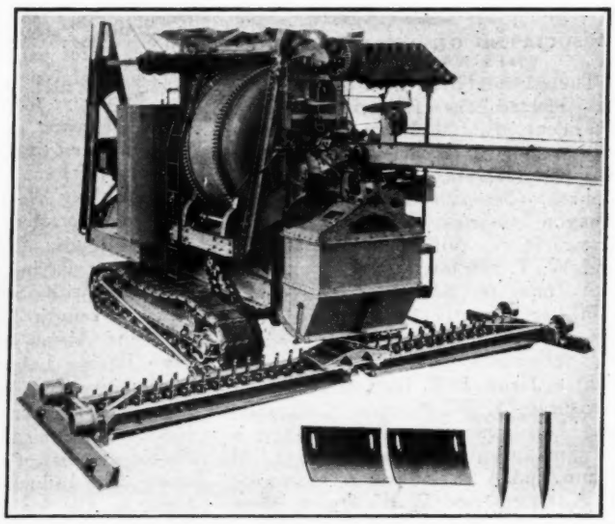
"SAFTEE" DUMP BODY

The Ditwiler Mfg. Co. Galion O., manufactures an all-steel dump body which is hand operated and recommended for 1-ton and 2-ton trucks. A hand wheel is keyed to a 1⅛ inch steel shaft, at the other end of which is a case-hardened worm and worm wheel enclosed in a grease-packed malleable housing. This worm wheel turns a 1¼ inch screw shaft running parallel with the body, on the end of which shaft is an 8-inch screw protected by a dust-proof cover which works through a floating nut between two heavy rocker arms. These rocker arms are welded to heavy angle irons which in turn are welded to the bottom of the dump body. As the screw shaft turns through the nut, the body is raised or lowered. It is claimed that, by reason of its construction, it is under absolute control at every point with no danger of a ratchet not operating and the crank striking the operator. It is self locking in any position. It has ball thrust bearings, and alemite grease cups on all working parts. It can be raised to 45 degrees in thirty seconds and lowered in fifteen seconds.

The body is made of various dimensions to fit various size frames, with capacities from one cubic yard to two cubic yards. It is made of ten guage steel, electrically welded, square type, heavily reinforced with steel angles. It has double acting tail gate, held at any angle by adjustable chains. The ground clearance when raised is



BAY CITY TRACTOR SHOVEL



KOEHRING SUBGRADE PLANER

Resists Corrosion from every Source

The Pipe shown here was recently relaid in Chicago after being used for 33 years

The underside of American cities is a hotbed of corrosive elements. The natural corrosive action of the soils is increased by the action of cinders and ashes, in the soil, by seepage and industrial refuse. Even the simple thing of regularly dumping ice cream freezers above a main has formed compounds that have quickly eaten through mains not of Cast Iron Pipe.

The iron in Cast Iron Pipe possesses a natural rust-resisting character, not given to this element in any other form.

As a result, Cast Iron Pipe lasts indefinitely. Water mains have not been in use long enough to show the limits of its working life.

Cast Iron Pipe dug up in Baltimore in 1916 — Underground since between 1820 and 1835

No case has ever come to light where Cast Iron Pipe wore out under average service conditions.

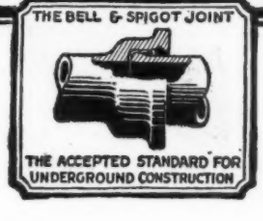
This Bureau will cooperate in any plan involving the use of Cast Iron Pipe.

Address: RESEARCH ENGINEER

THE CAST IRON PIPE PUBLICITY BUREAU, PEOPLES GAS BUILDING, CHICAGO

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request



Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

18 inches. It is attached to a chassis by four U bolts without requiring the drilling of any holes.

HEPNER SEWER ROOT CUTTER

The Hepner Sewer Root Cutter Company, Freeport, Ill., manufactures an instrument for cutting and removing roots from sewers and also removing other refuse. It consists of two cutting blades of plow steel sharpened to a knife edge, each approximately semi-cylindrical in shape. These cutters are held apart by two arms of spring steel which allow the cutter to be pushed through a sewer where the joints are slightly out of alignment. An arrow with long barbs which moves in the axis of the sewer pierces the mass of roots, and as the roots are cut loose and packed back into the spring steel arms, the barbs on the arrow keep the roots that have been cut off securely within the cutter when it is being withdrawn after it has gathered its load of roots. The operation is described as similar to that of rodding a sewer, the root cutter being attached to the end of an ordinary sewer rod and used without the use of cables or windlasses. The cutter is pushed vigorously against a mass of roots, cuts off the load and is withdrawn, the roots removed and the cutter pushed ahead again for a second load.

The cutter is made of sizes suitable for sewers from 4 inches to 14 inches in diameter. It is constructed entirely of heavy hand forged steel with knife edge blades. The makers state that this cutter can be used for removing roots as far as 250 feet from a manhole.

EVER-READY MAUL

The Kensington Steel Company, Chicago, Ill., manufactures a maul with renewable plugs. The two plugs which do the pounding are of hard wood driven into a head of steel which is claimed to be practically non-breakable and not affected by heat. Consequently the plugs, when battered or worn out, can be removed easily by removing the hickory handle and throwing the entire head into a fire and burning out the wooden plugs. New ones can then be inserted, the cost of which is 70 cents a pair. The new plugs are driven in and small lugs hold them in place. Mauls are made weighing 18 pounds and 26 pounds.

KNICKERBOCKER 7 S MIXER

The Knickerbocker Company, Jackson, Mich., announces its 1927 7 S and 10 S mixer as a response to demands for concrete with less water in the mix and a mixing period of a minute and a half. The new design has been tested in the field during the Summer of 1926 and will be on the market by the beginning of 1927. In order to maintain the daily capacity with a longer mix, the charging and discharging time are both made more rapid, the opening on the charging side being increased to 22½ inches and on the discharging side to 20 inches, the diameter of the drum being increased to 50 inches.

Other changes are the substitution of bevel gears actuated by a hand wheel instead of levers for operation of the discharge chute; the frame has been made heavier, 7-inch channels, arc-welded and reinforced with steel gussets, being used; split bearings have been given the countershaft, which makes replacement of worn parts easier. The 7 S has a positive measuring pressure water tank of 12 gallons capacity, and the 10 S one of 18 gallons. The power is either an 8 h.p. radiator cooled Le Roi gas engine or a 5 h.p. electric motor for the 7 S, with 11½ h.p. and 7½ h.p. respectively for the 10 S.

ILLUMINATING GAS TORCH

The Alexander Milburn Co., Baltimore, Md., has just placed on the market a gas cutting torch for use with illuminating and by-product gases. As city gas can be used costing but one thirtieth as much as other gases, it is claimed that there is a great saving in the use of this torch. An outstanding and exclusive feature of this torch is the super-heater, which heats and expands the cutting oxygen, and also the preheating gases, raising the temperature of the cutting oxygen

OXY-ILLUMINATING GAS CUTTING TORCH

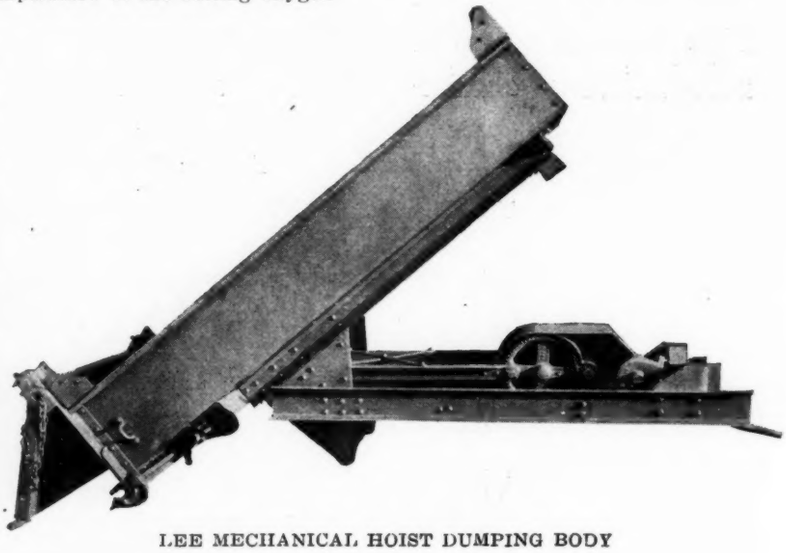
to approximately 100 degrees Centigrade prior to combustion. This increases the temperature of the gases at the tip of the torch, increases the rate of flame propagation in the burning mixture and reduces the oxygen consumption 25 per cent or more. A Bunsen burner inside the torch burns illuminating gas, which heats the cutting oxygen as it passes through a series of copper coils. The makers claim that heated and expanded oxygen in conjunction with illuminating gas gives better penetration into the metal, a narrow kerf, and sharp, clean edges, speedy and smooth cutting with a notable absence of metallic slag on the under side of the cut. Also that it does not case-harden the surfaces cut.

The torch is ruggedly constructed and easy to handle. It is supplied with a complete range of tips for light, medium and heavy cutting.

LEE MECHANICAL HOIST DUMPING BODY

The Lee Trailer & Body Co., Plymouth, Indiana has recently placed on the market a mechanical hoist dumping body which it claims is a new departure in dumping mechanism, although it has been tried out by the manufacturer on various types of trucks. It is operated from the power take off from the truck transmission, with worm gear, and has a continuous operation. It is self braking and can be stopped at any angle, and has a selective dumping angle. Claims made for it are that it has the proper load distribution on the truck, a low loading height, ample ground clearance and operates with minimum amount of power and more rapidly than hydraulic. Also that the maintenance cost as well as price is very low.

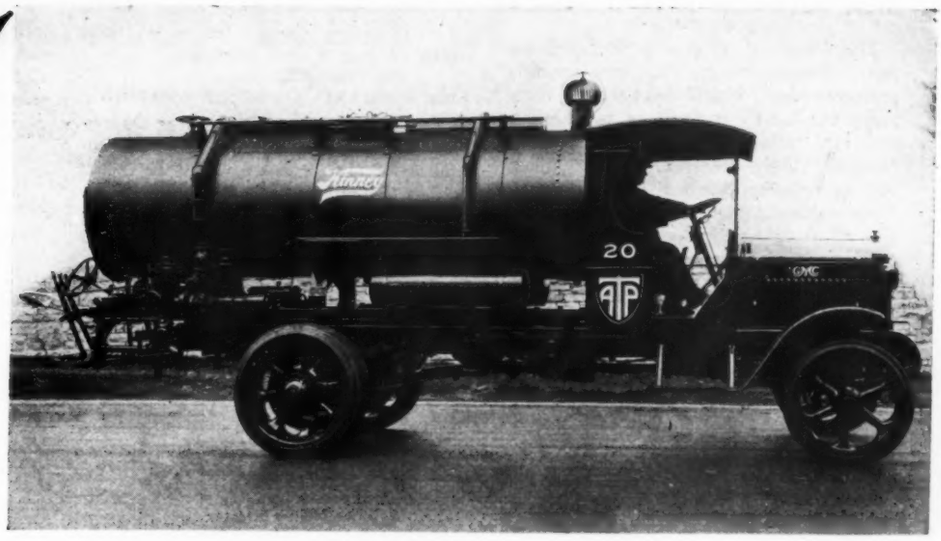
"EVER-READY" MAUL



LEE MECHANICAL HOIST DUMPING BODY

TRADE MARK
Kinney
REG. U.S. PAT. OFF.

Time Labor and Money Saver



The Kinney Heater and Distributor

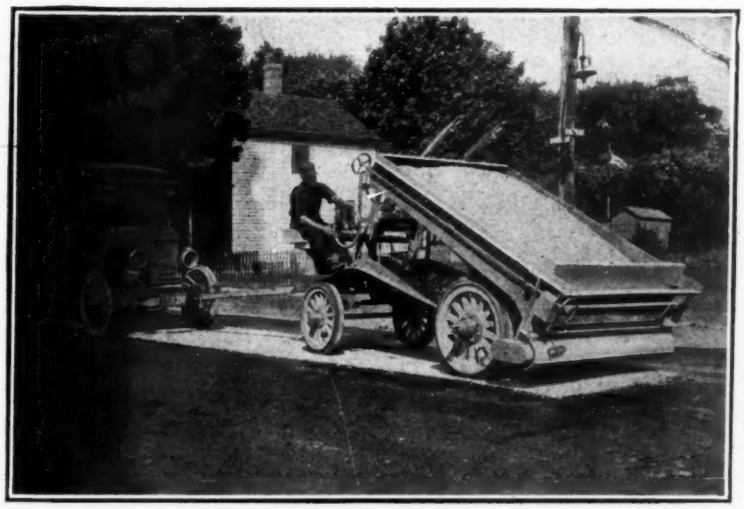
Meets all specification requirements. Guaranteed to sufficiently heat and properly apply all varieties and grades of bituminous material for road construction and maintenance.

Kinney Manufacturing Company

BOSTON, MASS.

New York *Philadelphia* *Philippine Islands* *Chicago* *Porto Rico* *Houston* *Cuba* *Kansas City* *Hawaiian Islands* *San Francisco*

PERMIT US TO INTRODUCE THE LATEST ADDITION



To Our Line of
Road Building Equipment
The

Reliance Chip and Sand Spreader

for covering oiled surfaces or spreading small stone on re-surfacing work.

Spreads 8 feet wide, places the material AHEAD OF THE WHEELS, SO THEY DO NOT RUN IN THE OIL. It can be operated with a FORDSON or any truck and 2 units will cover as fast as oil can be applied by a distributor.

We also manufacture and offer a complete line of Road Building, Quarry and Gravel Handling Equipment, including Crushers, Elevators, Screens, Bins, etc.

Let us show you how this equipment will save money for you.

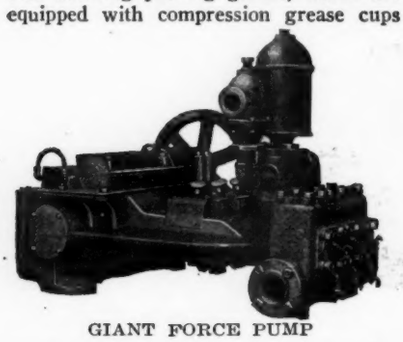
Send for Catalogue and prices.

UNIVERSAL ROAD MACHINERY CO.

141 MILK ST., BOSTON KINGSTON, N. Y. 114 LIBERTY ST., NEW YORK

HIGH PRESSURE ROAD BUILDERS' PUMP

The Domestic Engine & Pump Company, Shippensburg, Pa., has recently perfected the "Giant" heavy duty force pump for use by contractors, road builders, etc. This new pump is a large capacity, high pressure, three-cylinder, self oiling, single-acting plunger pump. The packing is held stationary by outside adusting packing glands, which are equipped with compression grease cups



GIANT FORCE PUMP

so that packing can be kept properly lubricated. Special features are automatic force feed oiling of all connecting rod and drive shaft bearings; steel gears, machine cut and running in oil; Hyatt roller bearings on high speed drive shaft: closed crank case to keep out dirt and retain oil. All bearing surfaces of the steel three-throw crank shaft are finished by grinding, and oil is forced through a drilled hole in the shaft direct to connecting rod bearings. Valve and valve caps are bronze and the 45 degree angle seating faces of the valves are practically self grinding. The pump is regularly powered by a 35 h. p., four-cylinder, industrial type gasoline engine with friction clutch and mounted on steel wheels, spring type trailer. The maximum working pressure is 600 pounds.

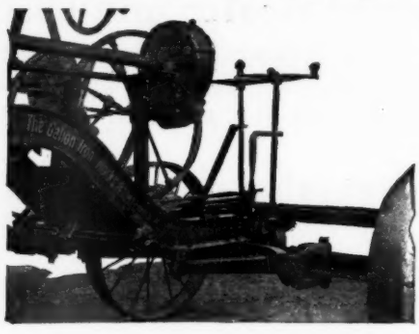
COLLINS WHEELED SCRAPERS

The United Iron Works, Inc., Kansas City, Mo., has recently introduced the Mike Collins Improved Scraper for which it claims as outstanding features extreme ease in handling, automatic elevating and tripping pan, knife blade on pan which permits finishing, ability to work in stumpy land, and easy and quick loading. The pan dumps at any height and rides from 18 inches to 20 inches above the ground. A light pull on the lever after the pan dumps brings it back into loading position. When loaded, the weight is divided equally on all four wheels. The pan can be elevated when necessary to pass over stumps or rocks and dropped back immediately to the ground. Separate end gates which work automatically can be furnished for handling dry dirt.

Steel and cast iron are used for all parts of the construction. The pan is of 3/16 inch boiler plate reinforced with steel bars and structurals; the ends being provided with electric steel trunnions with turned gudgeons. The cutting blade is 8 x 5/8" crucible cast steel securely riveted to the bottom of the pan and extending the full length. The wheel base is 8 feet; tread, 39 inches front, 54 inches rear; height 5 feet 6 inches, overall length 11 feet, width of pan 5 feet 7 inches.

NEW LEANING WHEEL GRADER

The Galion Iron Works & Manufacturing Company, Galion, Ohio, announces a new leaning wheel E Z lift grader, which was shown at the All-Western Road Show. Its outstanding feature is the Simplex pivotal frame adjustment which accomplishes the same purpose as a frame side shift on the rear axle, but with much less effort and a strengthening of this part of the grader. This device consists of two heavy parallel bars of electric steel, each attached at the front end by a vertical bolt to the frame of the grader and with a jaw at the rear extending over the axle, and attached to it by a vertical bolt. The bars pivot easily on these bolts. The rear end of each side of the frame of the grader rests and slides on strong electric steel segments as integral parts



RADIAL BAR AXLE PIVOTING DEVICE

of the pivotal bars. When the frame is adjusted to the extreme right or left, the pivotal bars act as a diagonal brace for the extended rear axle. The leaning wheel adjustments are operated by self locking machine-cut worm gearing in a bath of oil in an oil-tight gear case. The makers place emphasis on the fact that the bearings are machine fitted, and that all worm gears and screw thread adjustment for frame and mold boards are machine cut. These and other features of the Galion E Z Lift line of graders are to be found in this leaning wheel grader.

NEW F W D TRUCK

The Four-Wheel Drive Auto Company, Clintonville, Wis. has just placed on the market a 1½ to 2 ton four-wheel-driven truck known as Model H. It is constructed along the same general lines as the company's standard Model B, but has the motor in front of the dash instead of under the seat. Model H is built for general hauling, light road maintenance, snow removal work, and power line construction utility work. It has been tested out for several months past in South America under severe operationg conditions.

The overall length is 202 inches, the body space back of the seat being 9 feet 10 inches. The turning radius is 22 feet 6 inches, wheel base 121 inches, and tread 60 inches. Speed 22 miles an hour on 36" x 5" solid tires. The motor is a four-cylinder 4-cycle Wisconsin Model SU. The horse power is 25.6 SAE rating. There are four speeds forward and one reverse.

SKIP FOR CENTER JOINT CONSTRUCTION

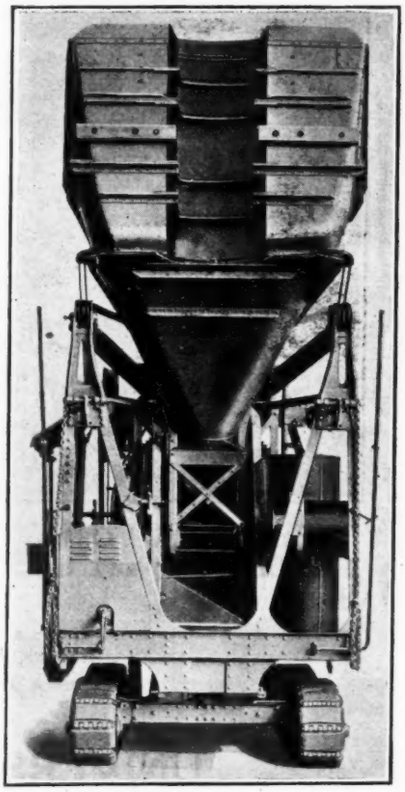
The Koehring Company, Milwaukee, Wis., has brought out an addition to its 27 E Paver in the form of a special skip for center joint construction. An arch with a clear width of 24 inches is built into the center of the skip. With this liberal clearance for the center joint, the skip comes flush to the subgrade without resting on the joint, so that the trucks may use the skip without interference just as with a standard skip. It is constructed of heavy tank steel and rigidly reinforced like the standard charging skip.

Another special condition is met by providing a narrow skip measuring 90 inches on the outside and 85 inches at a point four feet from the end, which is often found necessary in narrow-width paving.

SMALL BLUEPRINT OUTFIT

The C. F. Pease Company, Chicago, manufactures a blueprinting machine and sheet washer designed for the drafting room which does a limited amount of blue print work, or where emergency prints are wanted in a hurry. It will also be useful in vocational schools and high schools.

The machine consists of a half cylinder of glass supported in a metal frame coated with acid proof paint. The trac-



SKIP FOR CENTER JOINT CONSTRUCTION

Guaranteed for Years of Service!

Connery's Improved Oil Burning Heater

The Style "J" Oil Burning Kettle is not only a great labor saver but it actually saves money for the purchaser. It is a handy portable unit that is ready for the job on a moment's notice. It is exclusively an oil fuel burner. The arrangement of the tank enables the separate use of hot and cold materials. Due to this special feature cold material may be added without lowering the temperature of heated materials. You are therefore assured of lower fuel cost and absolute temperature control.

The Kettle is furnished with roller bearing wheels and springs. Inside tanks are electrically welded and can be removed for cleaning. Distributing tube is furnished to prevent inside tank burning out while the oil burner is furnishing a steady and uniform heat.

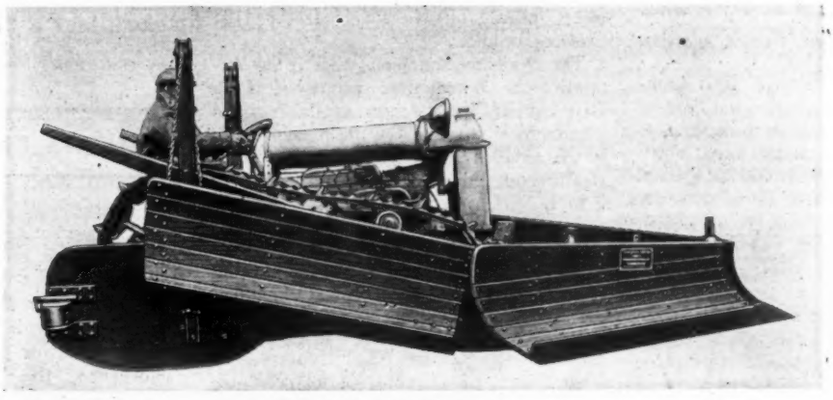
Heater can be equipped with either steel or rubber tires.

Write for catalog and prices.

CONNERY & COMPANY
INCORPORATED
3900 NORTH SECOND ST.
PHILADELPHIA, PA.

STYLE "J"
Made in Three Capacities
50, 75 and 100 Gallons.

Sargent Snowplow for Full-Crawler Fordson



Past performance justifies our guaranteeing satisfaction.

STANDARD WARANTY

Sargent snowplows are guaranteed to perform the work required of them if properly set up and operated.

DIMENSIONS

Height of V	22"
Width of V	7'
Total Width Wings, Open	12'
Total Width Wings, Closed	7'
Weight	1300 lbs.

Look for it at the

FORD POWER EQUIPMENT EXPOSITION

FORD MOTOR BUILDING **54th ST., AT BROADWAY, NEW YORK CITY**

There are over 200 exhibits, in all, of industrial and agricultural equipment for the Fordson Tractor and Ford Truck, to be seen at any time at the Exposition building. Come and look them over, or write us what types of apparatus interest you, and we will send you full particulars.

ing and blue print paper are held in contact with the glass by a curtain mounted on a spring roller. It is equipped with an electric arc lamp which is provided with a satin finish aluminum reflector, giving the best possible distribution of light. With a clear tracing and good quality blueprint paper, excellent blueprints can be made in any size up to 24 x 36 inches, using a 220 volt direct or alternating current lamp, the time required being one minute with one drop of the lamp. The machine requires only small floor space, and is constructed in a thorough mechanical manner, the frame work being so rigid that it is shipped set up.

PEASE BLUEPRINT MACHINE

INDUSTRIAL NOTES

THE HELTZEL STEEL FORM & IRON COMPANY

The Heltzel Steel Form & Iron Company, Warren, Ohio, advise that, owing to increased business during 1926, an addition to its plant is under way which will give the company 42,000 additional square feet, which will be devoted to the manufacture of steel bins, road forms, etc.; also new equipment which will be displayed at the Chicago Road Show.

The company now has ready for distribution a 32-page catalog covering some 20 different pieces of contractors' equipment and containing information of value to building contractors as well as to those who build roads, street and sidewalks.

STANDARD OIL COMPANY OF NEW JERSEY

J. S. Helm, formerly manager of asphalt sales of the Standard Oil Company of New Orleans, has recently been made general manager of asphalt sales of the Standard Oil Company of New Jersey, with office at 26 Broadway, New York City.

SULLIVAN MACHINERY'S DALLAS MANAGER

The Sullivan Machinery Company, Chicago, announces the appointment of J. E. M. Schultz as manager of its office at Dallas, Texas, to take the place of D. H. Hunter, who has resigned. Mr. Schultz was formerly connected with the Knoxville office of the Company.

WHITE 100,000 MILEAGE

The White Company, Cleveland, Ohio, state that 8,024 White trucks and busses have travelled over 100,000 miles each, 951 have run more than 200,000 miles, 384 have exceeded 300,000 miles, and are still giving service, while 72 have passed the half million mark, according to the owners' reports. The company has published a booklet listing all the owners of Whites which have travelled in excess of 100,000 miles.

DALLAS OFFICE OF CENTRAL FOUNDRY COMPANY

The Central Foundry Company, New York City, maker of Universal cast iron pipe, announces the appointment of Fred B. Sohle as sales representative for the Southwestern states, with offices in the Praetorian Building in Dallas, Texas.

LINK BELT COMPANY

The Link Belt Company, Chicago, has established temporary headquarters in New Haven, Connecticut, at 152 Temple street. R. H. Hagner, formerly of the Philadelphia office, will be the representative in New Haven. This office will be devoted especially to the sale of Link Belt Silent Chains and Link Belt Roller Chains. The Boston office of this company, formerly located at 49 Federal street, moved on November 1st to 1103 Statler Building.

The company announces that it has extended the horsepower range of Link Belt Silent Chain drives available from distributors' stocks from the present scale of ½ to 10 h. p. up to 15 h. p., in practically any reduction from 1 to 1 up to 7 to 1.

PENNSYLVANIA SALT MFG. CO.

The stockholders of this Philadelphia company on October 27th adopted an entirely new set of by-laws, which were also adopted immediately after by the six subsidiary companies. The Board of Directors was reorganized with George Fales Baker, as chairman, Miers Busch, pres., William P. Morris, first vice-president, and L. A. Smith, secretary and treasurer.

CLEAN DRY STEAM SPECIFICATIONS

Andrews-Bradshaw Co. Pittsburgh, Pa., has prepared standard specifications for "Clean" and "Dry" steam and have published the same in the form of a bulletin. The company claims that "commercially dry" and "clean and dry," as applied to steam, are terms which have heretofore had no definite meaning and it is with a view to supplying this lack that these specifications have been prepared.

The company announces that it will show in operation at Booth No. 17 at the New York Power Show and Booths 189 and 190 at the Chicago Power Show, a "Tracyfier" effecting complete removal of foam, water, fog and mist from steam before the steam leaves the boiler drum.

MATHIESON ALKALI WORKS

The Mathieson Alkali Works, New York City, has notified the trade that the schedule prices applying to bleaching powder and liquid chlorine during 1926 will be used to apply for deliveries during 1927. Contracts will be offered at these prices for the twelve months ending December 31st, 1927, at once.

CHAIN BELT COMPANY'S NEW BUILDING

The Chain Belt Company, Milwaukee, Wis., has just started work on a new engineering building at West Milwaukee, this building to be 308 feet long by 120 feet wide, except the office building which will be about 144 feet wide. This building will house the steel fabricating and assembly department, drafting room and general engineering offices of the contract division.

KILLEFER PAN BUSTER

An appliance used by a Chicago contractor for tearing up a brick pavement for laying an electric cable was described on page 354 of our October issue. In this it was stated that the bricks were ripped up by use of an agricultural sub-soiler, this being the name given by our correspondent. We are informed by the Killefer Mfg. Company that the tool so referred to was really a Killefer "Pan Buster," one of several tools manufactured by this company for similar purposes.

NEWS OF SOCIETIES

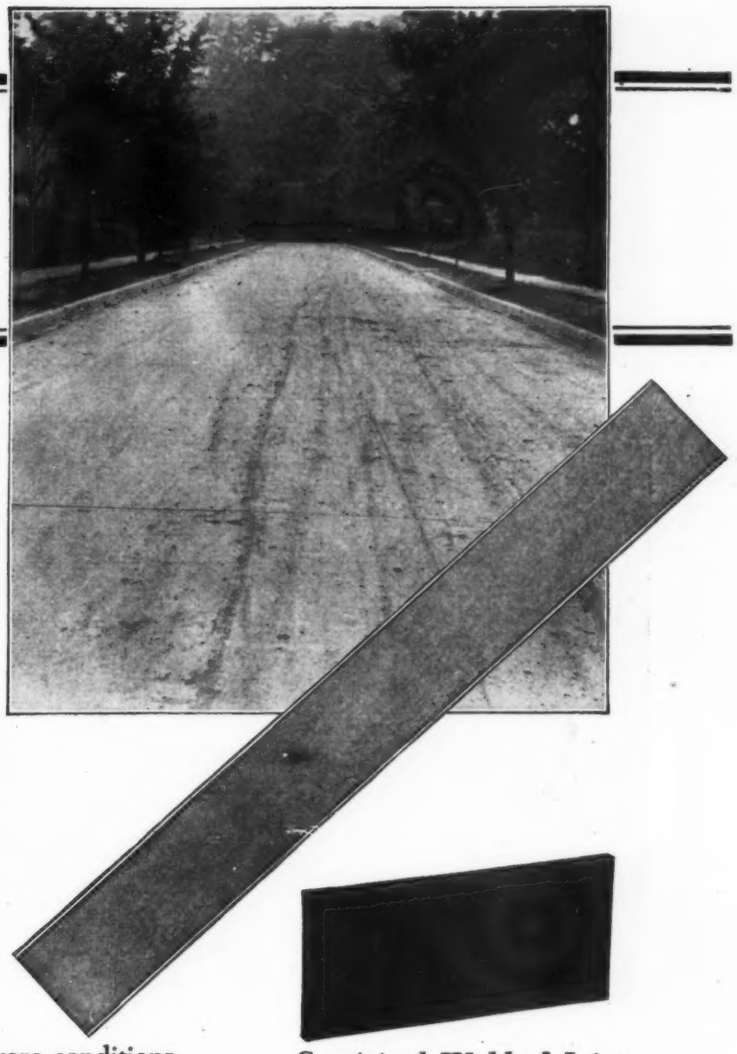
(Continued from page 37)

present low price level is due to a lack of knowledge on the part of contractors themselves as to the true cost of doing work, or at least the proper application of such knowledge when submitting bids for pavement construction. Therefore, the convention will endeavor to stress this point in a frank and open discussion by practical contractors in a practical way. A hearty invitation is extended to all contractors, whether members or not, to attend the sessions of the convention.

ASSOCIATION OF PUBLIC WORKS CONTRACTORS OF WESTERN WASHINGTON

This recently organized association, at its first meeting in Seattle on October 11th, elected R. G. Stevenson as president; John Otteson, vice-president, Peter Moceri, secretary and Louie Dowell, treasurer; all the officers being of Seattle.

Servicised Roads are Enduring—



A white ribbon of pavement looks fine just after it is completed. Whether it retains its appearance and utility six months or a year later depends on several factors—not the least being the expansion joints laid between the slabs.

If these have not proper elastic and resilient qualities and if they are incorrectly installed, the deterioration of any pavement is hastened! Foreign particles open crevices between the slabs and seepage undermines the subgrade with resultant cracks and cave-ins.

Conditions like this need never occur if the road builder uses Servicised Metal Edge Expansion Joints. Scientifically manufactured to meet and offset the most severe conditions, Servicised Joints eliminate all possibility of faulty installation and function accurately throughout the natural life of the pavement.

They are easily installed, with sufficient rigidity to eliminate use of backing board and at the same time to insure an accurate, non-wavy line. They have sufficient plasticity and resiliency to meet the contraction and expansion of the slabs but do not ooze out on the pavement and wear away and do not permit the working in of pebbles or other foreign substances. "Servicised" concrete roads are enduring!

See our nearest dealer or write us today for full information on the new Servicised Metal Edge Expansion Joint.

SERVICISED PRODUCTS CORPORATION

Manufacturers of Servicised Type B Expansion Joint, Metal Channel Cap, Red Coat Expansion Joint, Gray Filler, Sewer Pipe Joint, Asbestos Cement, Marking Paint, Metal Edged Expansion Joint, Rubber Oil, Center Strip, Rail Filler and Asphalt Filler.

6051 West 65th Street
CHICAGO, ILLINOIS

Servicised Webbed Joint

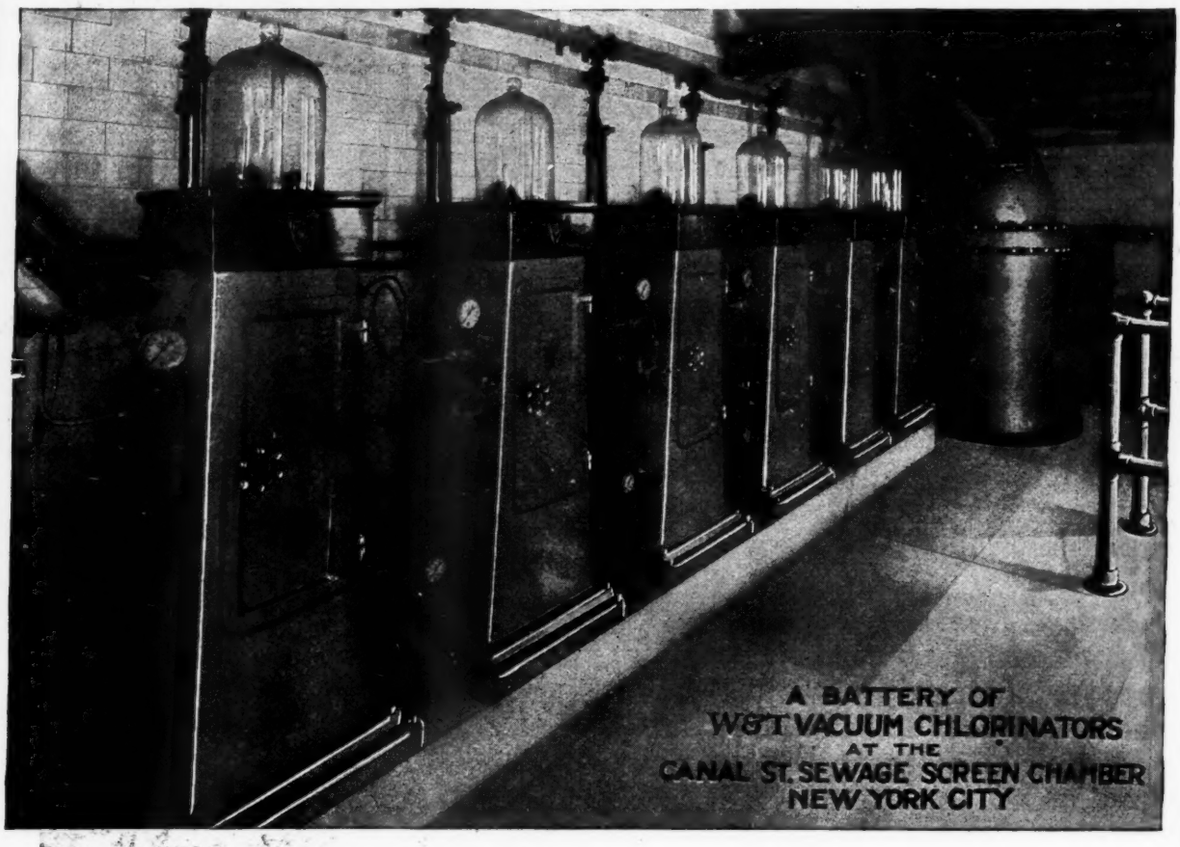
Another important and popular type is the Servicised Webbed Joint, a joint that offers increased rigidity without the loss of proper resiliency and resistance to traffic and wear necessary to the correct functioning of an expansion joint. It is particularly desirable when only ⅜" or ½" fillers are installed, in view of the additional rigidity and strength which the webbed sides produce.

Its reaction to the various physical tests normally applied to such materials indicates it to be a superior type of product in every respect, and where only the best is desired you cannot go wrong by specifying Servicised Webbed Joint.

This trademark, found on all Servicised Products, is the symbol of careful workmanship and sincere endeavor. It is a guarantee that Servicised Products are made right, sold right and will function right. Look for the trademark on all our products.

SERVICISED EXPANSION JOINTS

REG. U.S. PAT. OFF. © 1918



A BATTERY OF
W&T VACUUM CHLORINATORS
AT THE
CANAL ST. SEWAGE SCREEN CHAMBER
NEW YORK CITY

The W & T Vacuum Chlorinator

LONG LIFE
The first vacuum chlorinator is still in operation.

ACCURATE
Indicates the true chlorine flow —average error neligible.

SIMPLE
No diaphragm valves on the chlorine supply.

LEAK PROOF
Any leak would be *into* the apparatus—because of the vacuum.

NON-CORRODIBLE
Silver— platinum—glass—hard rubber—nothing else comes in contact with wet chlorine.

VISIBLE CONTROL
The glass bell jar lets you see what is going on.

LOW UP-KEEP
Averages less than 1% per year.

EFFICIENT
The vacuum completely empties the chlorine cylinders.

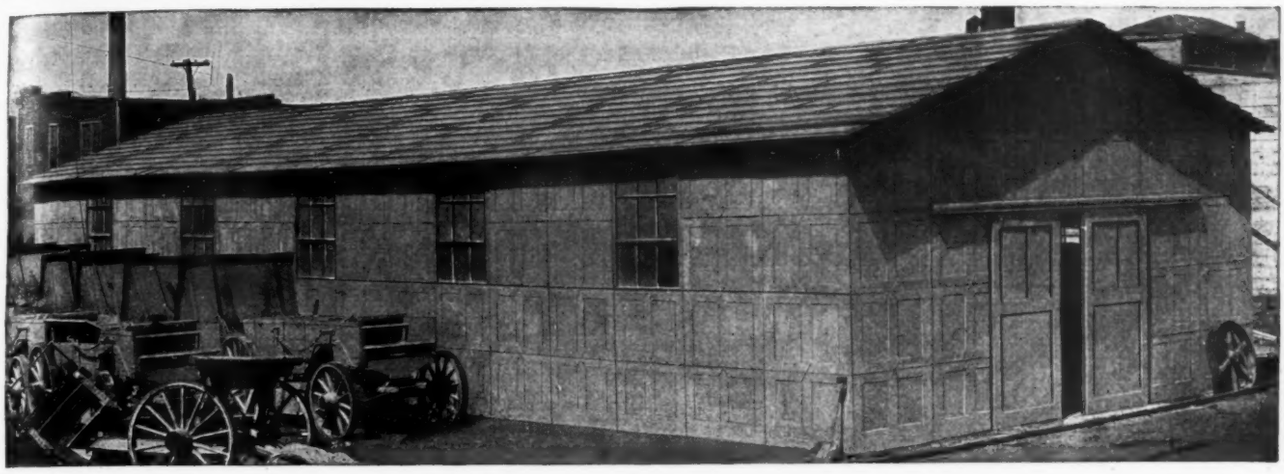
Write for Technical Publication No. 38N

"The only safe water is a sterlized water"

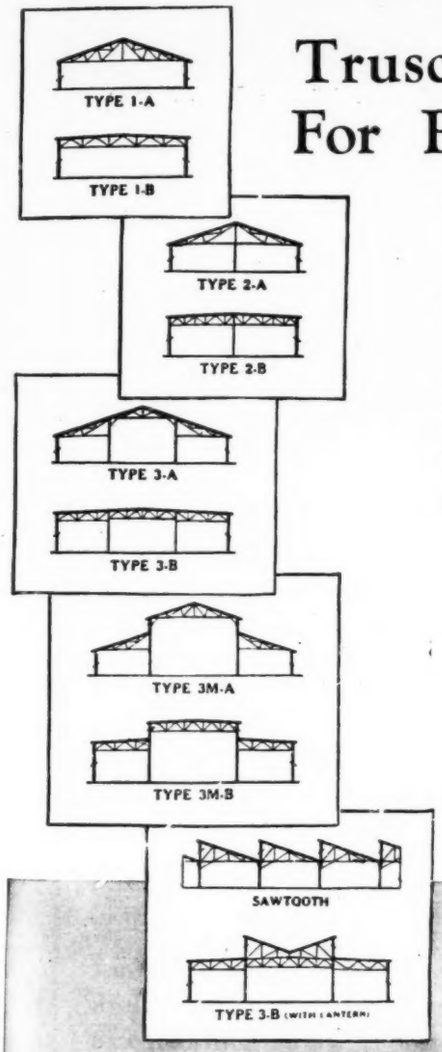
WALLACE & TIERNAN
COMPANY, INCORPORATED
NEWARK · NEW JERSEY

NEW YORK CHICAGO KNOXVILLE SAN FRANCISCO MINNEAPOLIS PITTSBURGH DALLAS KANSAS CITY
SEATTLE ST. LOUIS BUFFALO HARRISBURGH BOSTON INDIANAPOLIS CORTLAND, N. Y.
WALLACE & TIERNAN, LTD., TORONTO, CANADA

Sa3



Truscon Building used to house road equipment.



Truscon Offers Low Cost Housing For Road Equipment and Materials

YOU can get the type of building you need to shelter road equipment, machinery and materials most quickly and at least cost from Truscon. Design, manufacture, delivery and erection by Truscon. No responsibility for you. No extras. One cost—known in advance. Permanent, fire safe, durable copper steel construction.

TRUSCON STEEL CO., Youngstown, Ohio

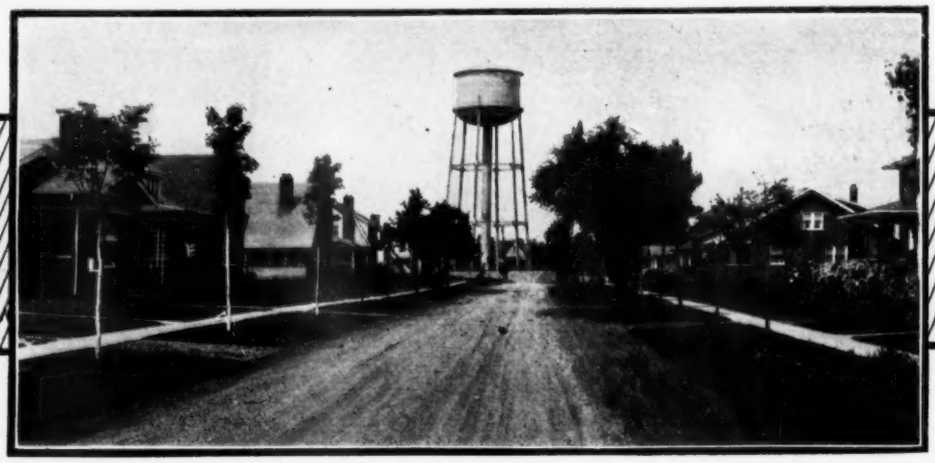
Warehouses and Offices in all Principal Cities.

TRUSCON PERMANENT BUILDINGS

Steel Deck Roofs

Truscon Ferrodeck and I-Plates are the lightest weight non-burning and economical roof decks for straight-away roofs on all kinds of buildings. Made of rust-resisting copper steel, insulated to any degree and weatherproofed with composition roofing.

Repeat Orders Prove Successful Service



The Chicago Bridge and Iron Works Now Employs 22 Buhl Compressors In All Parts of the Country

This company purchased one BUHL Type C-H Compressor-Hoist a few years ago for trial. Since then they have installed 21 additional machines of the same type.

The BUHL has proved to them that for tank erection work, it is the most economical outfit to install and operate. Furthermore, it easily withstands the hardships under which such work is conducted.

BUHL Type C Portable Compressors have proven to be the ideal machine for the use of municipalities and contractors in road building, tank erection and all other work, where compressed air must be brought to the job.

BUHL Type C Compressors are simple, compact machines with compressor and engine cast en bloc. Every part of a BUHL Compressor must conform to the highest and most modern standards of compressed air engineering.

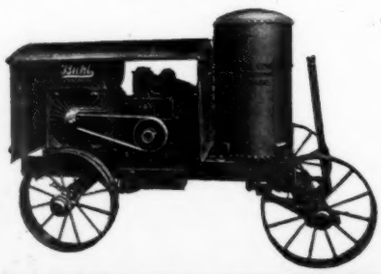
Crank shaft bearings are bronze backed, babbitt lined, renewable bushings. Lubrication is supplied by a mechanical, force feed system, assuring positive and abundant lubrication under all conditions. A high tension magneto furnishes a hot spot at slowest cranking speeds.

The Buhl Company

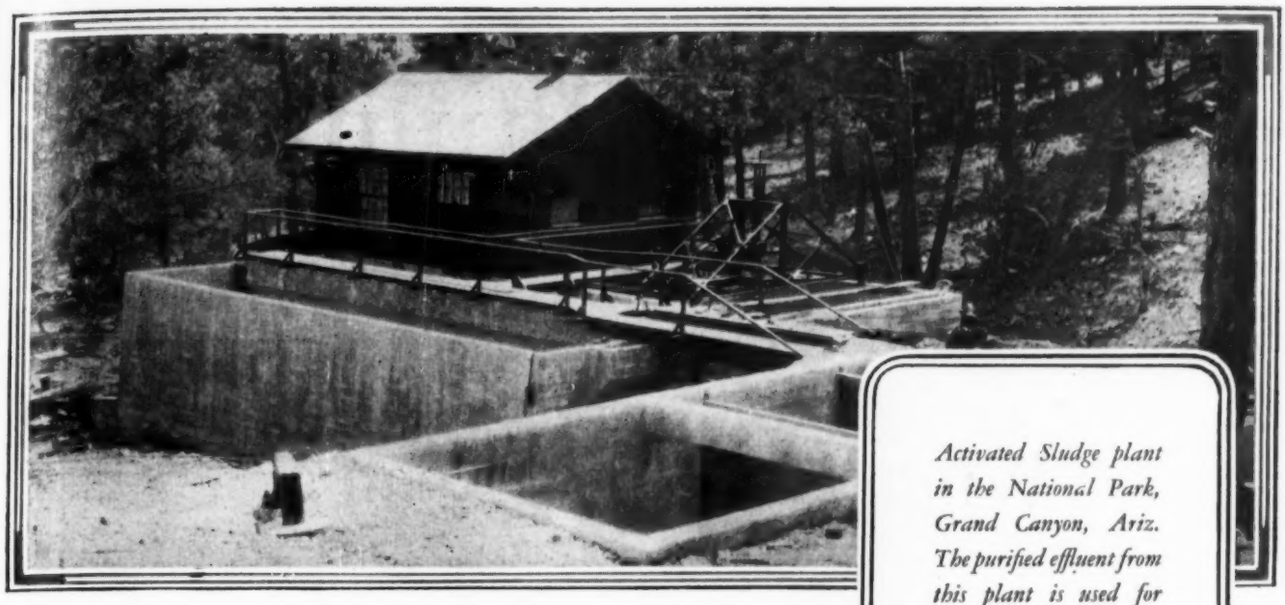
General Office—401 S. Dearborn St.

CHICAGO

The BUHL Type C Portable Compressor, illustrated at the right, is built in 55, 90 and 180 cu. ft. capacities and can be supplied with any mounting desired. WRITE FOR BULLETINS.



BUHL Type CH Combined Compressor-Hoist is skid mounted. Both hoist and compressor can be operated together. Can also be furnished on low wheel truck.



Activated Sludge plant in the National Park, Grand Canyon, Ariz. The purified effluent from this plant is used for irrigation, etc.

In the Heart of the Grand Canyon—

Dorr Equipment

Why are Dorr Clarifiers found in all types of sewage treatment plants ranging in size from the mammoth North Side plant at Chicago to the compact little plant pictured above?

The explanation is simple.

Dorr Clarifiers used as sedimentation units continuously remove the settled solids from the basins, produce a uniformly clarified effluent, and eliminate possibility of septic floating solids.

Its use cuts down the number of sedimentation units required, and allows for simple shallow tank construction.

These are some of the reasons that have prompted the installation of over 150 clarifiers throughout the country.

DORRCO

Write for bulletin on "Sanitary Engineering"

THE DORR COMPANY

ENGINEERS

247 PARK AVENUE NEW YORK CITY

DENVER LOS ANGELES CHICAGO WILKES-BARRE JOPLIN

THE DORR CO. LTD
16 South Street London E.C.2

DORR G. m.b.H.,
Joachimsthalerstr. 10, Berlin W.15

SOC. DORR ET CIE.
126, Rue de Provence Paris 8

INVESTIGATION TESTS DESIGN EQUIPMENT

Warrenite-Bitulithic Pavement

"A WARRENted Product"

What is a Good Road?

The engineer knows—and so does the contractor—but the real judge, the one whose opinion is unbiased and free—is the man who drives his own car.

Ask him about a certain road. Not when it is newly laid, nor even when it has had considerable use, but let him tell you what he thinks about a ten or more years old road that has been subjected to the gruelling wear of present day traffic.

If it's a Warrenite-Bitulithic Pavement, he won't know it is ten years old and probably wouldn't believe it if he was told. He only judges by the comfort he gets when driving over it—and it doesn't seem possible that any pavement can remain so smooth as long as does Warren Pavement.

Warren Brothers Company

A national organization to build good roads

EXECUTIVE OFFICES:

Boston, Mass.

DISTRICT OFFICES

New York, N. Y.	Phoenix, Ariz.	Toronto, Ont.	Charlotte, N. C.
Portland, Ore.	Washington, D. C.	Birmingham, Ala.	Melbourne, Australia
St. Louis, Mo.	Salt Lake City, Utah	Memphis, Tenn.	Sydney, Australia
Harrisburg, Penn.	Utica, N. Y.	Los Angeles, Cal.	Buenos Aires, S. A.
Vancouver, B. C.	Minneapolis, Minn.	New Orleans, La.	Tokyo, Japan
Chicago, Ill.	Oakland, Cal.	Dallas, Texas	Oklahoma City, Okla.

Dollars Earned, Miles Run, and Work Well Done

Graham Brothers Trucks are known the world over for unfailing records of dollars earned, miles run and work well done.

They are quality trucks, built complete in sizes and body styles to fit the needs of your business. They are priced low. They are serviced quickly, skillfully and reasonably by Dodge Brothers dealers everywhere.

The G-B emblem marks a truck that will work well and ably day in and day out, live long, cost little and make money for its owner.

GRAHAM BROTHERS
DETROIT
A DIVISION OF DODGE BROTHERS, INC

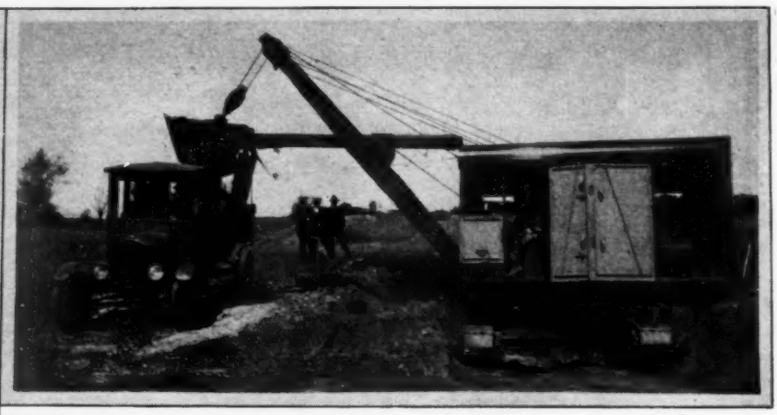
Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 91% of all hauling requirements.

1-TON CHASSIS, (G-BOY)	$ 885
1½-TON CHASSIS	1245
2-TON CHASSIS (Disc Wheels With Dual Rear, Optional)	1445

f. o. b. Detroit

GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



See the SPEEDER at the Chicago Road Show Jan. 10-14

You've heard a lot about the Speeder; maybe you have not yet had an opportunity to look one over. The Speeder will be at the Chicago Show for your inspection. Come and see us—get acquainted—learn what the Speeder is doing on work similar to yours.

This half-yard gas shovel has made a lot of contractors mighty glad they selected it for their work. We'll be glad to show you why it is the outstanding machine in its field.

Shovel
Pull Shovel
Crane
Clamshell
Dragline

The Positive Speeder Cable Crowd

Two Traveling Speeds

Two Drum Speeds

All-Steel Construction

Minimum number of parts (only 17 gears in all)

Sturdy, trouble-proof truck and traveling mechanism

Steers from the cab

Many other exclusive features

SPEEDER MACHINERY CORP'N.

Cedar Rapids, Iowa

(formerly Fairfield, Iowa)

SPEEDER

CURE CONCRETE *while you mix it!*

Many road builders who previously used Dowflake as a surface curing agent are now using it added directly to the mix in the form of a solution.

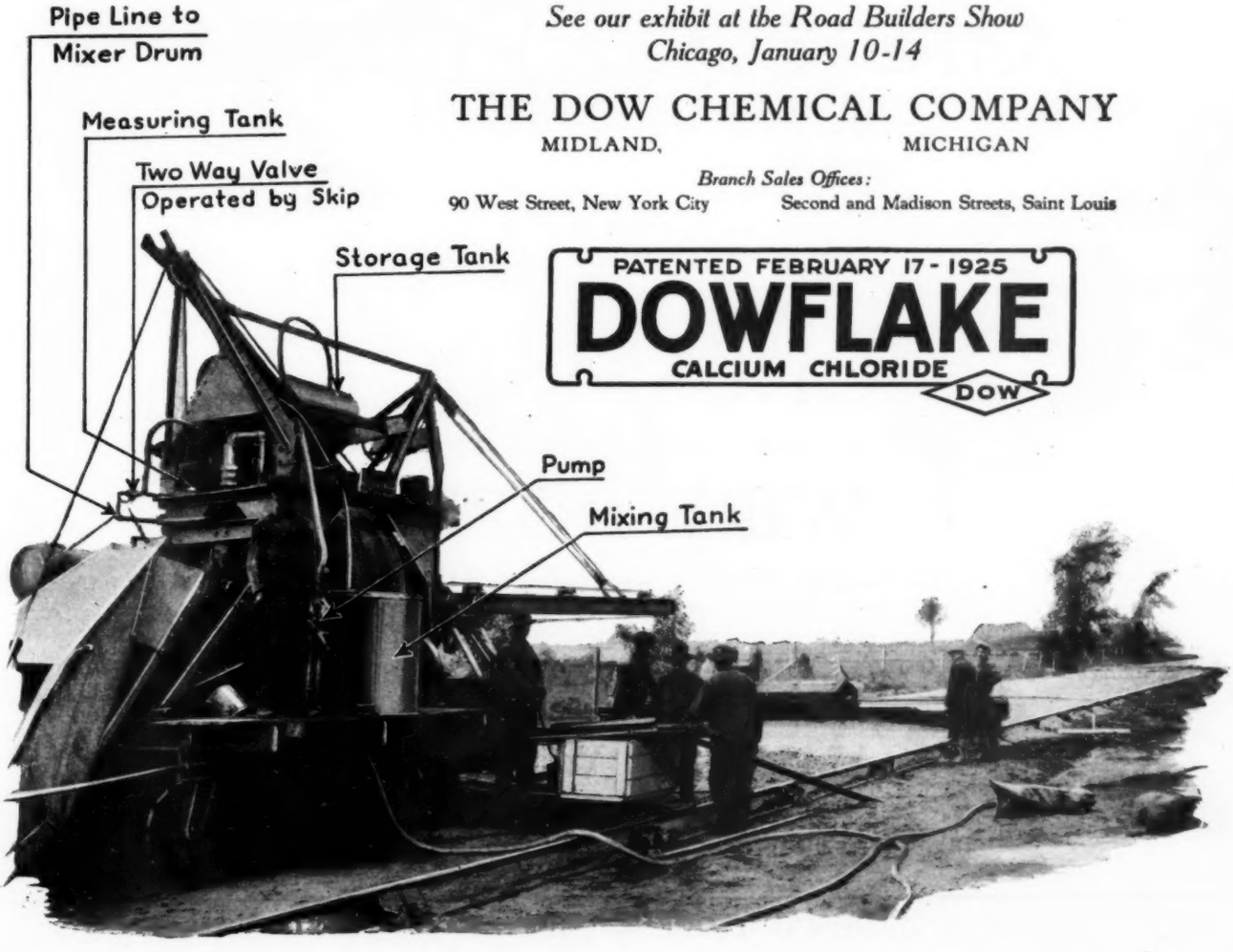
Any standard mixer can be easily equipped to permit admixture curing. The illustration shows an excellent arrangement. The Dowflake is mixed in an open-top mixing tank. From the mixing tank the solution is pumped into a storage tank. This feeds a measuring tank, which is automatically opened by the skip when it comes up. This releases the proper amount of solution which runs into the mixer drum with the cement and aggregates.

This admixture method results not only in greater economy and ease of handling, but also insures more uniform curing because the curing agent penetrates throughout the mix.

See our exhibit at the Road Builders Show
Chicago, January 10-14

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Branch Sales Offices:
90 West Street, New York City Second and Madison Streets, Saint Louis



We think this is one of

THE BEST GUIDES TO SAFETY EVER WRITTEN

If in doubt about the tensile strength of wire rope you get—don't use it.

If more people would think of this when using Wire Rope there would be fewer mistakes made in using ropes of the wrong tensile strength and consquently fewer accidents.

WILLIAMSPORT

Telfax Tape marked—Factory certified

WIRE ROPES

Completely eliminate all doubt as to the tensile strength of ropes and if you want to be safe rather than sorry—demand the rope that gives you this protection. It costs no more and many save your life.

WILLIAMSPORT WIRE ROPE CO.

Main Office and Works:
Williamsport, Penna.

General Sales Office:
Peoples Gas Bldg., Chicago

USE MADESCO BLOCKS—THEY STAND THE GAFF

4 for the city of Chicago

Cities all over the country have found Northwest the most profitable for municipal use.

The city of Chicago has just purchased a fourth,
the city of San Diego, California, has two,
the city of El Paso, Texas, has two,
the city of Tacoma, Washington, owns one,
the city of Cleveland, Ohio, owns one,
the city of Lakeland, Florida, owns one, and there are many more.

Mobility

NORTHWEST
CRANES-SHOVELS CONVERTIBLE and DRAGLINES
Gasoline-Diesel-Electric

NORTHWEST ENGINEERING CO.
The world's largest exclusive builders of gasoline, electric and Diesel powered shovels, cranes and draglines.
1739 Steger Building 28 E. Jackson Boulevard
Chicago, Ill.

PW 12-Gray

DEPENDABLE

The Mark of Quality

In the power house, or on outside electrical connections — in the machine shop or garage—wherever friction tape is used—Firestone High Test and Holdfast Friction Tape meet the most exacting demands.

High Test

—scientifically prepared—of highest uniform quality—possessing great tensile strength and gripping properties. Impregnated with special sulphur-free adhesive rubber to withstand dirt, moisture, heat and cold.

Holdfast

—a popular priced friction tape of known quality, made in the Firestone factories at Akron, Ohio. For everyday use in store, factory or home, Holdfast has proven to be a good durable tape.

Write nearest Firestone branch or the Home Office at Akron, Ohio, for prices and specifications. Stock up with these two dependable brands, for the winter business ahead. Sold in bulk or convenient cartons.

Firestone
Friction Tape

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . Harvey S. Firestone

KOEHRING

Fast Discharge. Faster Spouting Concrete

No time wasted in *beginning* Discharge.

The *instant* operator throws the lever, the batch comes pouring from the drum—in *record* time—*uniform* to the last shovelful!

—and because the Koehring *re-mixing* action coats every fragment of aggregate thoroughly with cement, Koehring mixed concrete is *fast spouting*, without excess of water. The Koehring means—

—Seconds saved on every batch.

—Uniform, re-mixed, dominant strength concrete.

—Heavy Duty Construction which means long trouble-free service life—the minimum of maintenance, the greatest conservation of your investment.

MIXER SIZES

Pavers—7-E, 13-E, 27-E. Auxiliary equipment and choice of power to suit individual needs. Complies with A. G. C. Standards.

Construction Mixers—10-S, 14-S, 21-S, 28-S. Steam, gasoline or electric power. Mounted on trucks or skids. Rubber tired wheels optional. 28-S on skids only. Complies with A. G. C. Standards.

7-S Dandie Mixer—Two or four cylinder gasoline engine. Power charging skip, or low charging hopper and platform. Rubber tired steel disc wheels or steel rimmed wheels. Complies with A. G. C. Standards.

Write for Construction Mixer Catalog No. CM-14

KOEHRING COMPANY

PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES

MILWAUKEE WISCONSIN

Sales Offices and Service Warehouses in all principal cities

Foreign Department

Room 1370, 50 Church St., New York City

Canada, Koehring Company of Canada, Ltd., 105 Front Street, East, Toronto, Ontario

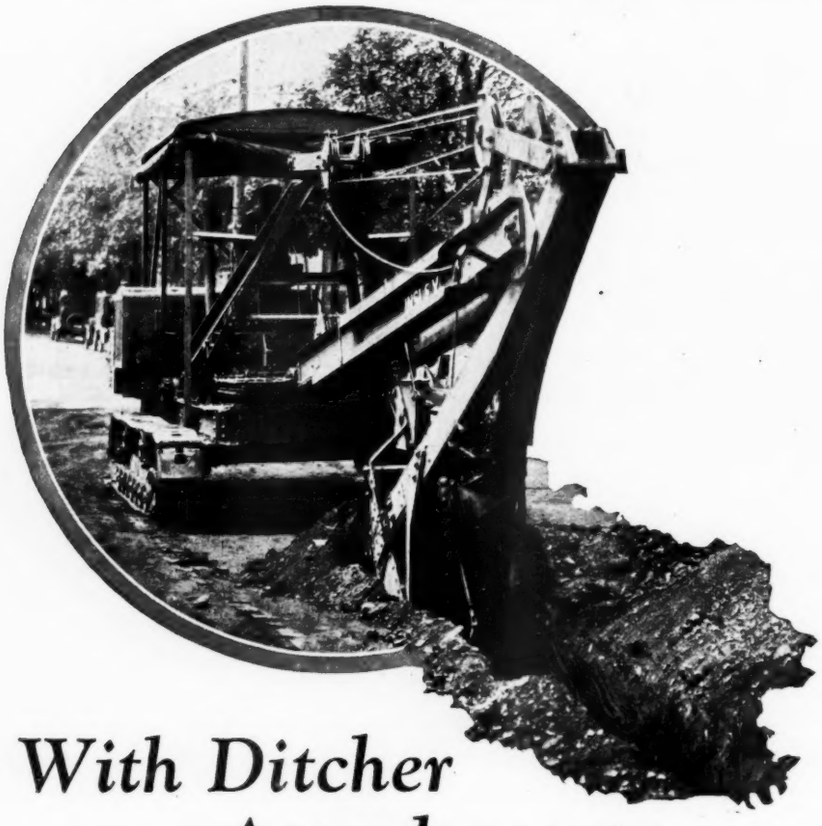
Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D. F.

KOEHRING HEAVY DUTY

A-2747

THE INSLEY EXCAVATOR

for SHOVEL · DITCHER · CRANE
SKIMMER AND DRAGLINE WORK



With Ditcher Attachments

RUGGED and sturdy, speedy and easy to handle, flexible yet powerful, and economical to operate—these are some of the qualities of the Insley Ditcher which enable it to dig a clean, straight ditch or a basement in any sort of soil, and handle such work profitably for you.

The Ditcher is only one of six interchangeable attachments, each of which is built for a special type of work and all of which together make the Insley Excavator a good all-round machine, which represents the best value in its class.

Write us for Catalogue No. 49.

INSLEY MANUFACTURING CO.
Engineers and Manufacturers
INDIANAPOLIS

No. 488

SHOVEL

SKIMMER

DRAGLINE

CRANE

All Attachments Readily Interchangeable

INSLEY

CONCRETE PLACING EQUIPMENT
STEEL DERRICKS
BUCKETS AND CARS
EXCAVATING EQUIPMENT

Monticello, N. Y. Road Constructed with Standard Macadam Asphalt Binder "B" Penetration Method 1925.

STANDARD
ASPHALT
BINDER B
For Penetration Work

SOCONY
ASPHALTS AND ROAD OILS

Standard Asphalt Products

Standard Asphalt Binder A *for surface treatment.*

Standard Asphalt Binder B *for penetration work.*

Standard Asphalt Binder C *for the mixing method.*

Standard Cold Patch Asphalt *for repairing all types of bituminous road surfaces.*

Standard Refined Asphalt *for sheet asphalt paving.*

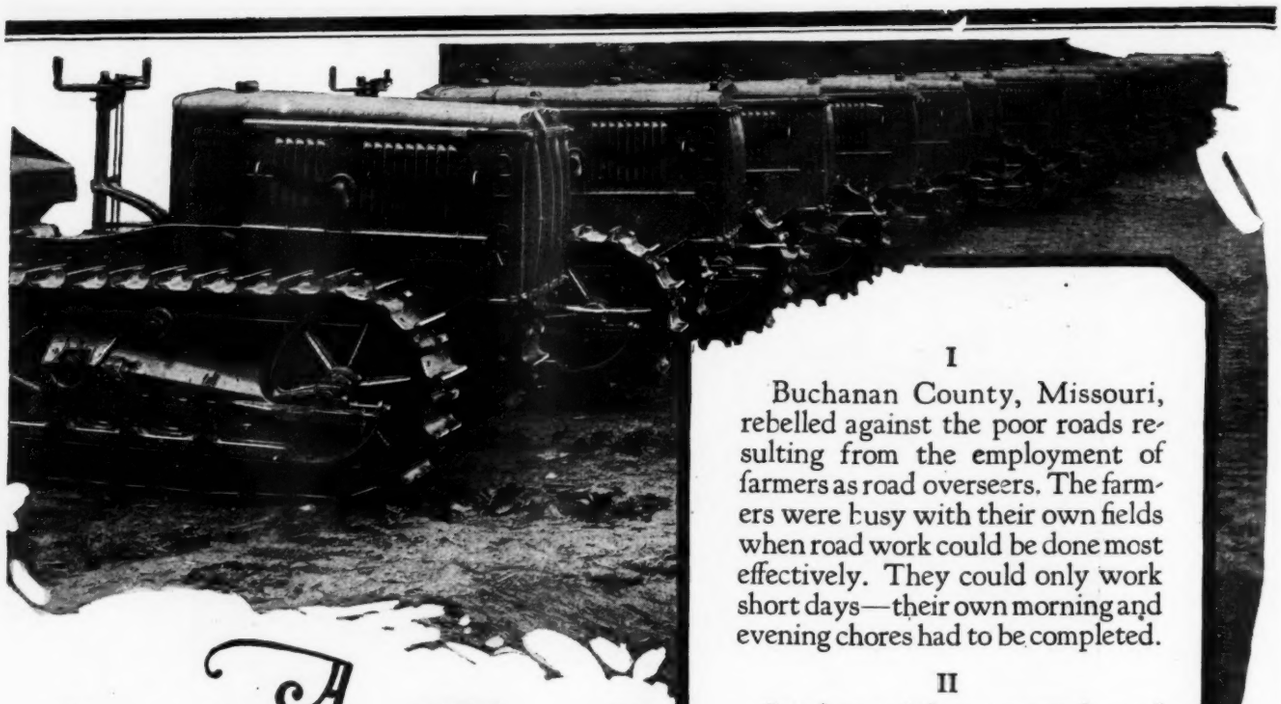
Standard Asphalt Joint Fillers *for brick and block pavements.*

Standard Paving Flux, Standard Bridge Asphalt and Preserving Oils.

Specifications and all other particulars furnished on request

STANDARD OIL CO. OF NEW YORK

26 Broadway



A "Caterpillar" Tractor Scenario Entitled GOOD ROADS-

BETTER
QUICKER
CHEAPER

There is a "Caterpillar" dealer near you

CATERPILLAR TRACTOR CO.
Executive Offices: San Leandro, California, U. S. A.
Sales Offices and Factories:
Peoria, Illinois San Leandro, California
New York Office: 50 Church Street
Successor to
BEST C. L. Best Tractor Co. The Holt Manufacturing Company HOLT

106-1226

I

Buchanan County, Missouri, rebelled against the poor roads resulting from the employment of farmers as road overseers. The farmers were busy with their own fields when road work could be done most effectively. They could only work short days—their own morning and evening chores had to be completed.

II

So they tried out a number of tractors and finally purchased a 2-Ton "Caterpillar".

III

On the strength of the performance of this tractor, the County then purchased thirteen additional "Caterpillars".

IV

The forty-one farmer overseers were replaced by fourteen full-time patrolmen (each with a tractor) and two road overseers.

V

The actual recorded saving during the first quarter of 1926 was $7,945.38—at the rate of $30,000 a year.

VI

And roads were better!

"Caterpillar" Tractor Prices

2-TON - - - $1850
(Peoria, Illinois)

5-TON - - - $3250
(Peoria, Illinois)

THIRTY - - - $3000
(Peoria or San Leandro)

SIXTY - - - $5000
(Peoria or San Leandro)

CATERPILLAR
REG. U.S. PAT. OFF.

MAKERS OF POWDERS SINCE 1802

Farming used to be an extremely primitive occupation, before the invention of mechanical farm labor.

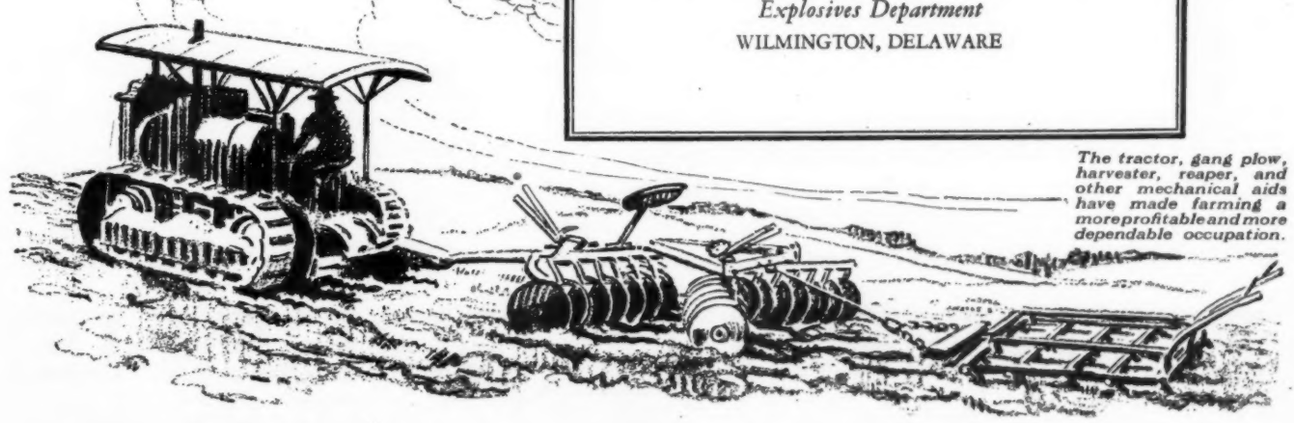
Facilities

that assure satisfaction

MERELY assembling materials and putting the machinery to work for manufacturing explosives is comparatively easy. However, to produce, out of hand, those intangible and wholly indispensable facilities representing the constant efforts of many years, is a most difficult accomplishment.

The experiences acquired in a century and a quarter of explosives manufacturing and the observations of explosives experts have provided the du Pont Company with adequate facilities to cope with the present demands for explosives. With its plants strategically located and sufficient production assured, du Pont explosives can be specified with entire confidence as to prompt deliveries and satisfactory performances.

E. I. DU PONT DE NEMOURS & CO., Inc.
Explosives Department
WILMINGTON, DELAWARE



The tractor, gang plow, harvester, reaper, and other mechanical aids have made farming a more profitable and more dependable occupation.

125 YEARS OF LEADERSHIP IN THE SERVICE OF INDUSTRY

14 Days of Snow Removal Paid For a Barber-Greene

And now $10,275 is added to the appropriation every Winter

During summer months the Barber-Greene Snow Loader can be converted into an efficient bucket loader. In this capacity it loads and batches materials for road and patching work—it handles your sewage sludge and garbage—or any one of a number of odd loading jobs.

Complete details are shown in "Modern Snow Removal." Send for your copy today.

The Barber-Greene that we are talking about is now in its fourth season, saving money for an eastern city.

During the first fourteen days that it worked, four years ago, this Barber-Greene more than paid back its entire original cost.

On an average snow removal season of eighteen ten-hour days, city officials tell us it saves $10,275.

In other words, as soon as this Barber-Greene had worked fourteen days it turned back some $570 into the appropriation for streets and alleys, every day it was on the street.

These savings, which are virtually additions to the appropriation, can be readily converted into street repairs and new streets and alleys next summer.

The Barber-Greene can effect such remarkable dollar and cents savings in snow removal because of two definite things:

first: it eliminates the cost of over 90 men every ten hour shift it works.

second: it cuts down the number of trucks required from 20 to 9.

In addition, the Barber-Greene reduces the tremendous losses to retail stores, shipments, and general business the heavy snow storms incur.

And next summer when the money which the Barber-Greene has saved, is being put into streets and alleys, the Barber-Greene can be converted into an efficient bucket loader to handle the gravel, or sand. Or it can be put to work loading garbage, sewage sludge and similar materials.

A copy of "Modern Snow Removal" will show you in detail how Barber-Greene Snow Loaders are virtually adding millions to street and alley appropriations through their savings in snow removal—and how they are helping the city to build and repair streets and alleys in summer.

Send for your copy today.

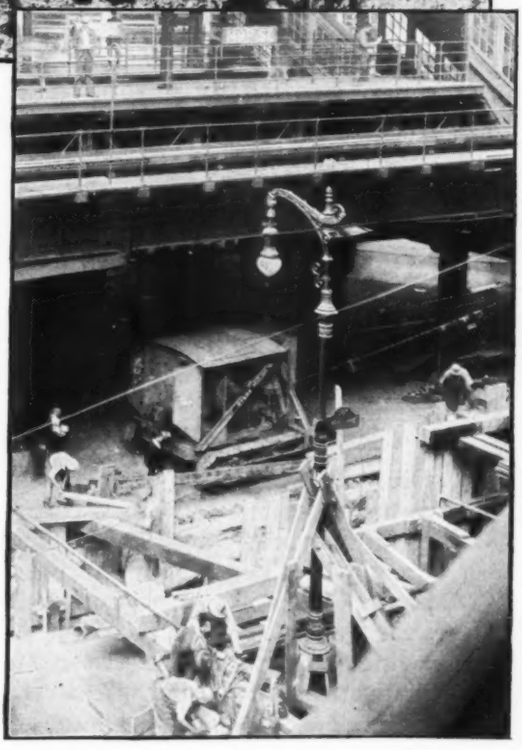
BARBER-GREENE COMPANY—*Representatives in 50 cities*—635 West Park Avenue, Aurora, Ill.

BARBER GREENE SNOW LOADERS

PORTABLE BELT CONVEYORS
BUCKET LOADERS

VERTICAL BOOM
DITCHERS

See the 1927 ROAD SHOW WEEK of JAN. 10



(Above)
Bear Cat Ditcher on drainage job in Colorado.

(Left)
Bear Cat working on new Wacker Drive project, Chicago, Wrigley Building in background.

(Right)
On subway excavation in New York City.

CHICAGO—NEW YORK or Where are YOU?

SKIMMER

SHOVEL

CLAMSHELL

DITCHER

BACK FILLER

MAKES no difference to the BEAR CAT. It does the same fine job of digging, lifting, grading, ditching, backfilling or what have you, in the shade of the elevated or out in the great open spaces.

The point is, if you haven't a BEAR CAT or two working for you, you're missing an awfully good bet. We'll gladly give you all the dope, without obligation.

THE BYERS MACHINE CO., Ravenna, Ohio
Builders also of Byers Truckrane
Sales and Service Throughout the Country

Gentlemen:—
Please send me the new Bear Cat Book. The type of work I am particularly interested in is _____

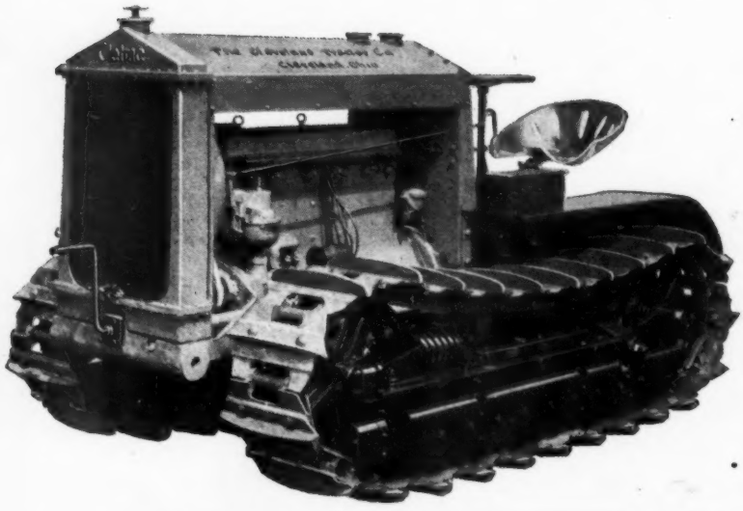
Name _____
Address _____
Town _____
State _____
P.W. 12-26
The BYERS MACHINE CO., Ravenna, Ohio

BYERS BEAR CAT

Cletrac

Power and Profit

IN *power, speed* and the application of advanced engineering principles, Cletrac Crawler Tractors are easily the most *profitable* tractor investment.



Nebraska Test Ratings

Official tractor test ratings are available to the public, and wise buyers use them as a guide in making their tractor purchases.

Exclusive Cletrac Features

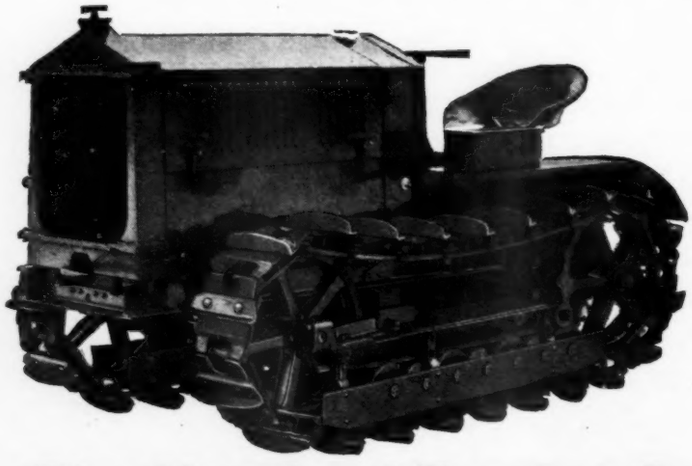
On All Models—Cletrac patented steering arrangement permitting constant power on both tracks when turning. Plain lower track wheel bearings, requiring no adjustment. "Snap" lubrication system; one shot type. *On the "75" and "30"*—Six cylinder motor. Manganese steel track. Manganese steel drive sprockets.

Nebraska Test Ratings On Cletracs

		Cletrac Thirty	Cletrac 2 Ton
Max. Draw Bar Horse Power	At Low Speed	38.58	24.53
Max. Draw Bar Pounds Pull	At Low Speed	6170	4590
Maximum Belt Horse Power		48.62	30.15
Miles per Hour, High Speed		4.885	4.225

A comparison of these ratings with other tractors of similar rated capacity will be convincing proof of Cletrac's *Power* and *Speed* superiority.

The Cletrac "75" Will Be On Exhibit at the Road Show Held in Chicago January 10-14—The CLETRAC Booth is NC-2

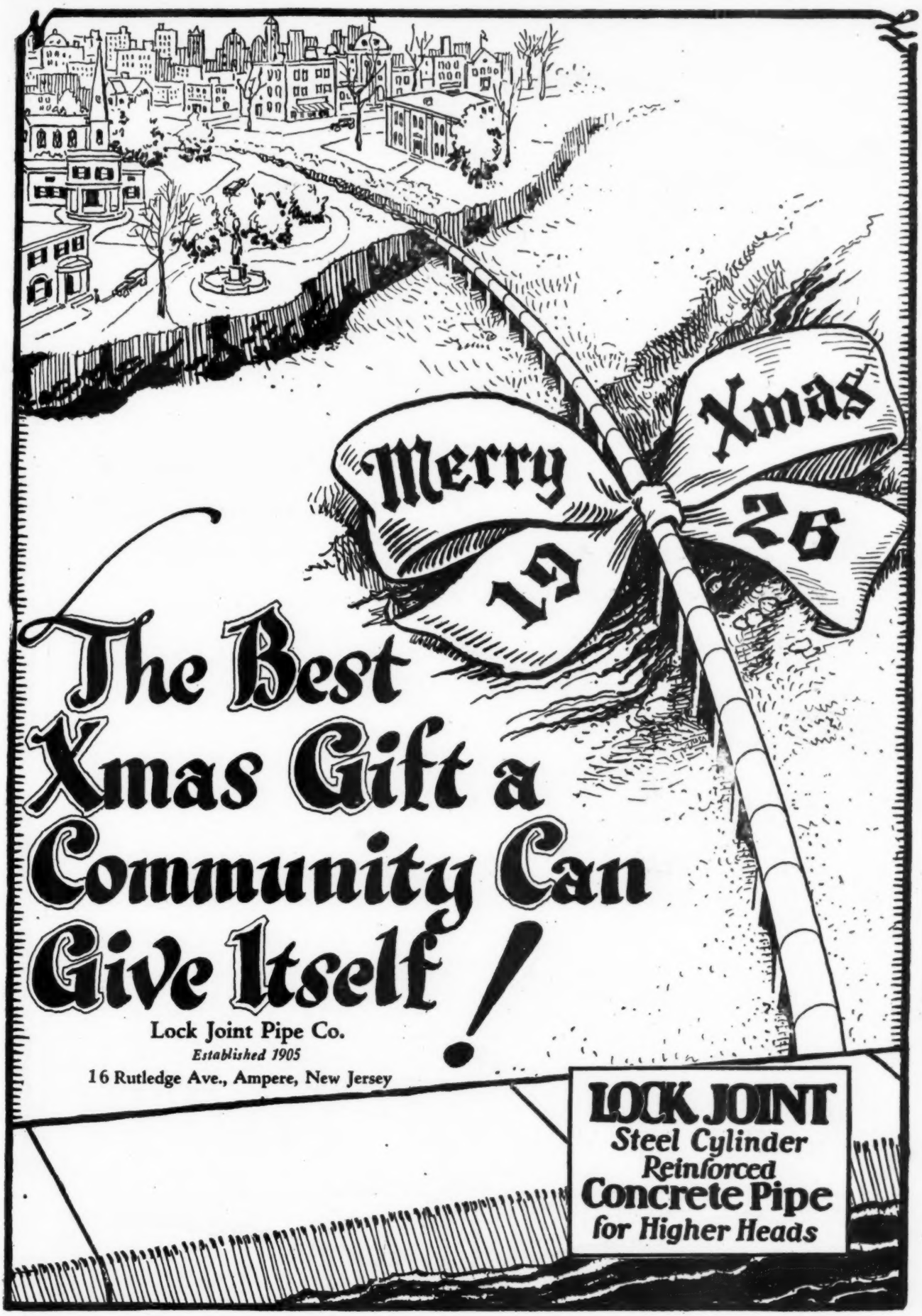


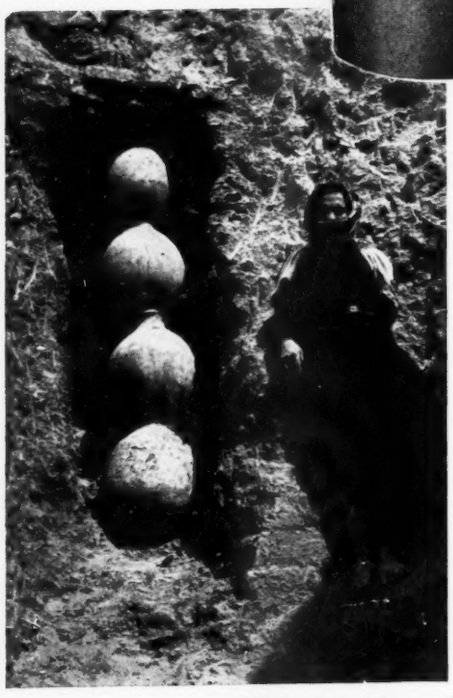
Superior Tractor Value

A tractor represents an investment in *Power.* Cletrac power is the most *profitable* Power on the market today figured on a "per mile, per yard or per hour" basis.

A wire, letter or card will bring a Cletrac representative to you.

The Cleveland Tractor Co., Cleveland, Ohio


Merry
Xmas
19
26
The Best Xmas Gift a Community Can Give Itself!
Lock Joint Pipe Co.
Established 1905
16 Rutledge Ave., Ampere, New Jersey
LOCK JOINT
Steel Cylinder
Reinforced
Concrete Pipe
for Higher Heads



The Ancients proved—and Moderns approve of these VITRIFIED CLAY STANDARDS

Modern engineers are more and more recognizing the corrosion and disintegration resisting qualities of Vitrified Clay.

Excavations of ancient cities have unearthed Vitrified Clay Products that have withstood the ravages of time—still intact after 6000 years.

To meet the demands of modern requirements a book on Standards has been prepared, which lists and illustrates the standards of manufacture of Vitrified Clay Sewer Pipe and Fittings, Fire Clay Flue Linings and Fittings, Stove Pipe and Fittings, and Wall Coping and Fittings.

These Standards were adopted in collaboration with Engineers, Architects, Builders and Technical Societies.

The Booklet, "Standards," will be mailed free on request.

Write for information.

EASTERN CLAY PRODUCTS ASSOCIATION

Colonial Trust Bldg., Philadelphia, Penna.

The Cambria Clay Products Co., Blackfork, Ohio
Clay City Pipe Company, Uhrichsville, Ohio
The Crouse Clay Products Co., Akron, Ohio
The Dennison Sewer Pipe Co., Dennison, Ohio
The East Ohio Sewer Pipe Co., Irondale, Ohio
The Evans Pipe Co., Uhrichsville, Ohio
The Junction City Sewer Pipe Co., Junction City, Ohio
Kaul Clay Manufacturing Co., Toronto, Ohio
The Logan Clay Product Co., Logan, Ohio
The Patton Clay Mfg. Co., Patton, Pa.
Penna. Clay Products Co., West Winfield, Pa.
Peerless Clay Manufacturing Co., Port Homer, Ohio
Portland Stone Ware Co., 80 Federal St., Boston, Mass.
The Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
The Robinson Clay Product Co., Akron, Ohio
The Robinson Clay Product Co., of Pennsylvania, Clearfield, Pa.
The Romig Clay Product Co., Uhrichsville, Ohio
The Ross Clay Products Co., Uhrichsville, Ohio
St. Marys Sewer Pipe Co., St. Marys, Pa.
The Wolf-Lanning Clay Co., Dennison, Ohio

For permanence:-

It must be Vitrified Clay Pipe!

The Mystery Bin???

The Cat Will Be Out of The Bag In The January Issue of this Publication WATCH FOR IT

AT the January Road show, Chicago, will be displayed, for the first time, the most revolutionary piece of material-handling equipment you have ever seen—

a HELTZEL steel bin and batching outfit so radical in its departure from former designs—

so different in principle, in performance, in utility—

so infinitely superior to any similar product catalogued to-day—

that three nationally known contractors and two prominent building supply dealers, taken into our confidence, were amazed at the spectacular sight which confronted them.

Guarded zealously under lock and key—
known only to a few trusted employees—

further facts concerning this marvel of material-handling will remain a *closed book* until the HELTZEL Caravan leaves for Chicago, loaded down with new designs of road and street building equipment and material handling products.

However, descriptive broadside giving detailed information on the HELTZEL Mystery Bin will be mailed not later than January 10th to all who return the coupon enclosed.

There is no question but that the HELTZEL Mystery Bin will be the outstanding sensation of the 1927 American Road Builders Association Road Show at the Coliseum, Chicago, January 10th to 14th.

See it at booth No. 55

THE HELTZEL STEEL FORM & IRON COMPANY, Warren, Ohio, manufacturers of steel forms for concrete roads, curb and gutter, driveways and sidewalks, trailer bins, sectional bins, agrabatchers, center joint machines, finishing machines, traveling bridges, steel batch boxes, steel mortar boards, steel tool boxes, etc.

THE HELTZEL STEEL FORM & IRON COMPANY,
No. 20 Thomas Road,
Warren, Ohio.

Put my name on the list to receive facts about the HELTZEL Mystery Bin.

Name .....

Address .....

City ..... State .....

Publication
Pub. Wks.

State Road, North of Dyer, Ind.

Lincoln Highway Detour, South of Dyer, Ind.

THE TWO ROADS shown in the above photographs are examples of the results that can be obtained, at very low cost, by the use of Stanolind Cut Back Asphalt for Cold Surface Treatment.

These roads, before treatment, were worn and irregular old asphalt macadam roads. When improvement was started, the road was first prepared by filling in all bad ruts and depressions with a mixture of Stanolind Cut Back Asphalt for Cold Surface Treatment, and well graded stone. This mixture was used cold, and was thoroughly compacted into place.

The Surface Treatment consisted of two applications of Cut Back Asphalt, applied cold, and one application of clean, well graded, washed limestone.

The first application of asphalt was made at the rate of one-tenth gallon per square yard, after the roadway had been cleaned and freed of dust.

The application of stone consisted of about twenty pounds per square yard. The stone was dragged until it had developed into a true surface, filling in all exceedingly low areas.

The second application of asphalt was then made at the rate of about fifteen-hundredths of a gallon per square yard.

Heavy traffic was admitted to the road twenty-four hours after the work had been done.

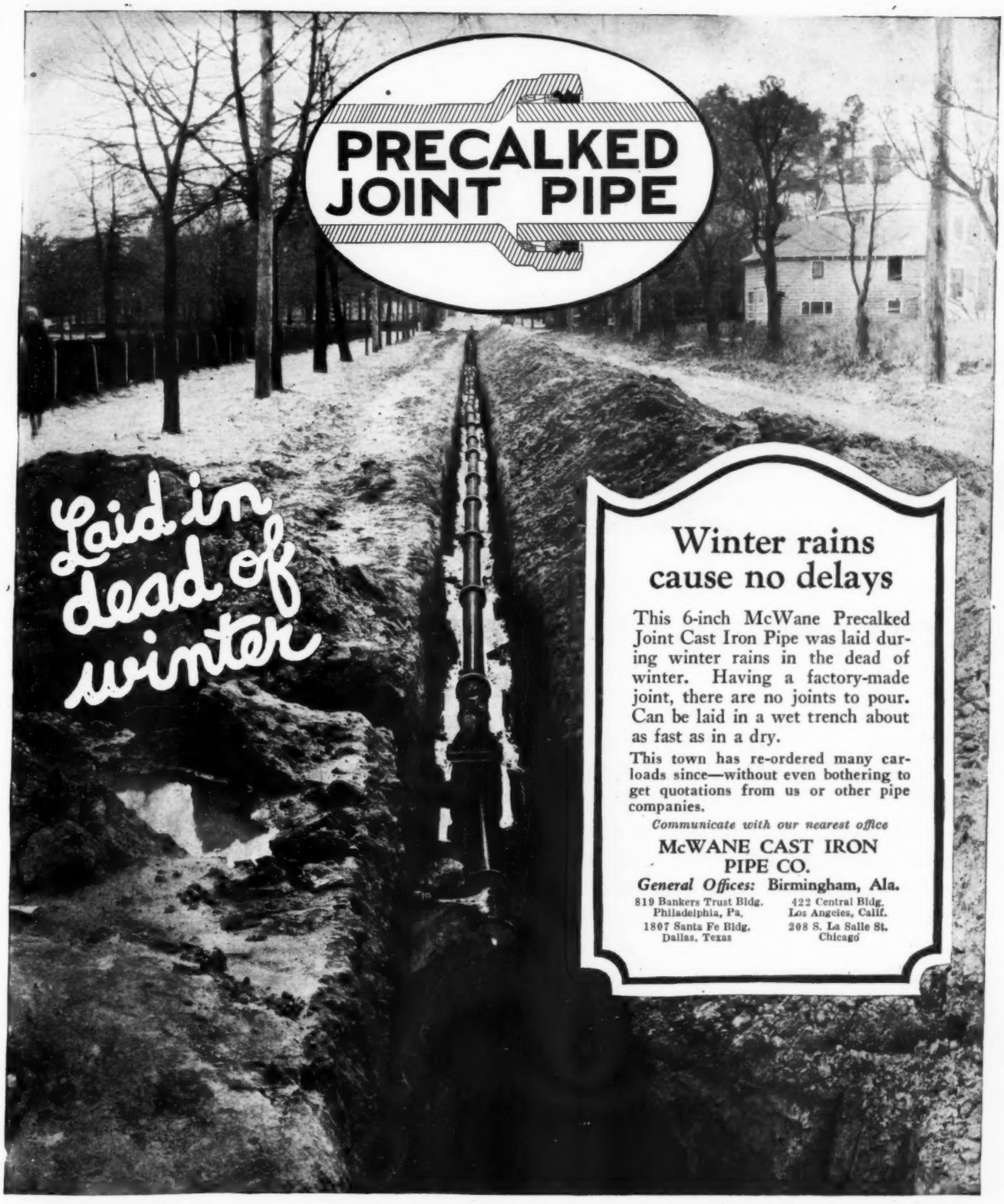
The cost of this kind of treatment is from five to ten cents per square yard, depending on conditions. This figure includes cost of labor, machinery and material.

STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Avenue CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	S. DAKOTA	N. DAKOTA	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Huron	Fargo	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	MICHIGAN	Minot	Mankato	St. Joseph
Joliet	South Bend	Mason City	Detroit	WISCONSIN	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	Grand Rapids	La Crosse		
Quincy	Wichita		Saginaw	Milwaukee		



Winter rains cause no delays

This 6-inch McWane Precalked Joint Cast Iron Pipe was laid during winter rains in the dead of winter. Having a factory-made joint, there are no joints to pour. Can be laid in a wet trench about as fast as in a dry.

This town has re-ordered many carloads since—without even bothering to get quotations from us or other pipe companies.

Communicate with our nearest office

McWANE CAST IRON PIPE CO.

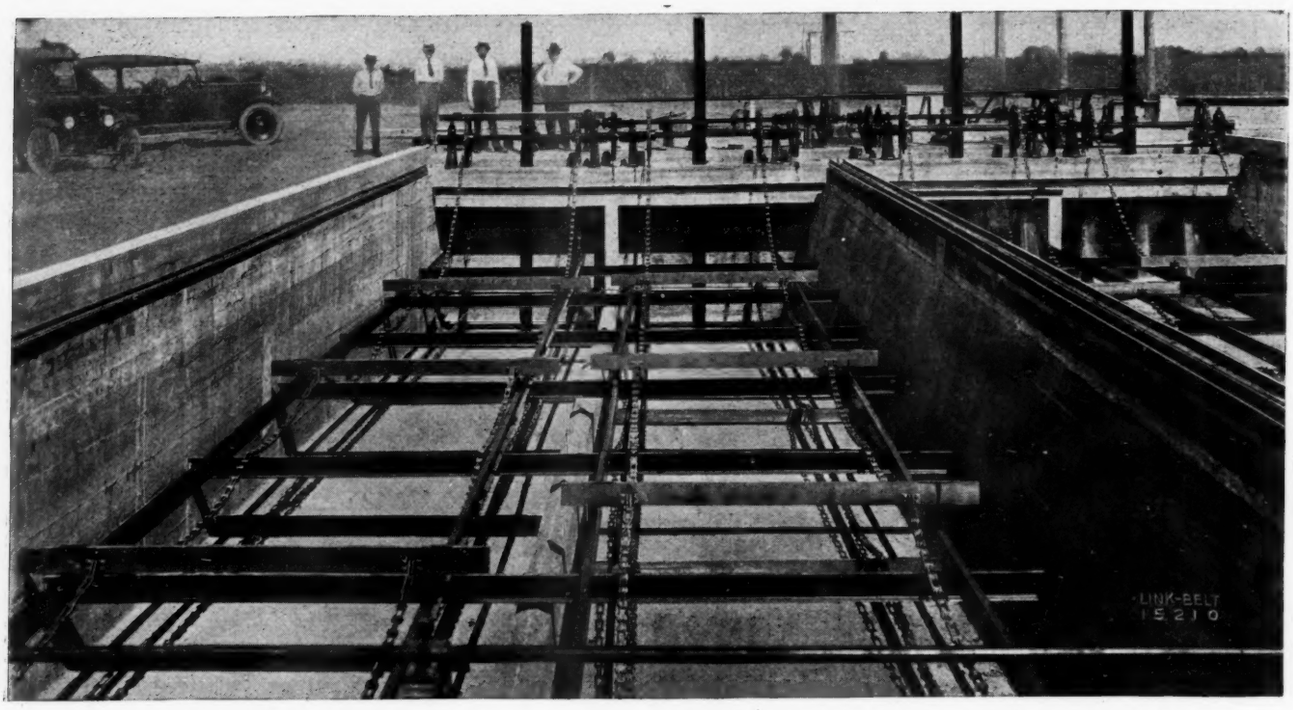
General Offices: Birmingham, Ala.

819 Bankers Trust Bldg. Philadelphia, Pa.
422 Central Bldg. Los Angeles, Calif.
1807 Santa Fe Bldg. Dallas, Texas
208 S. La Salle St. Chicago

factory made joint

McWane precalked

CAST IRON PIPE



Settling Tanks with Link-Belt Sludge Collectors at the Sewage Treatment Plant, Tulare, Cal., (Henry Ellrod, Consulting Engineer).

Re-Building Old Sewage Treatment Plants

DESIGNING a new sewage plant usually taxes the knowledge of an experienced engineer to the utmost. But when the attempt is made to enlarge and bring up-to-date—to rehabilitate—an old, obsolete plant, difficulties to a degree far more complex than those ordinarily met are encountered.

Thus, at Tulare, Calif., Mr. Henry Ellrod, Consulting Engineer, solved one of the City's most perplexing problems by installing Link-Belt Sludge Collectors in the septic tanks.

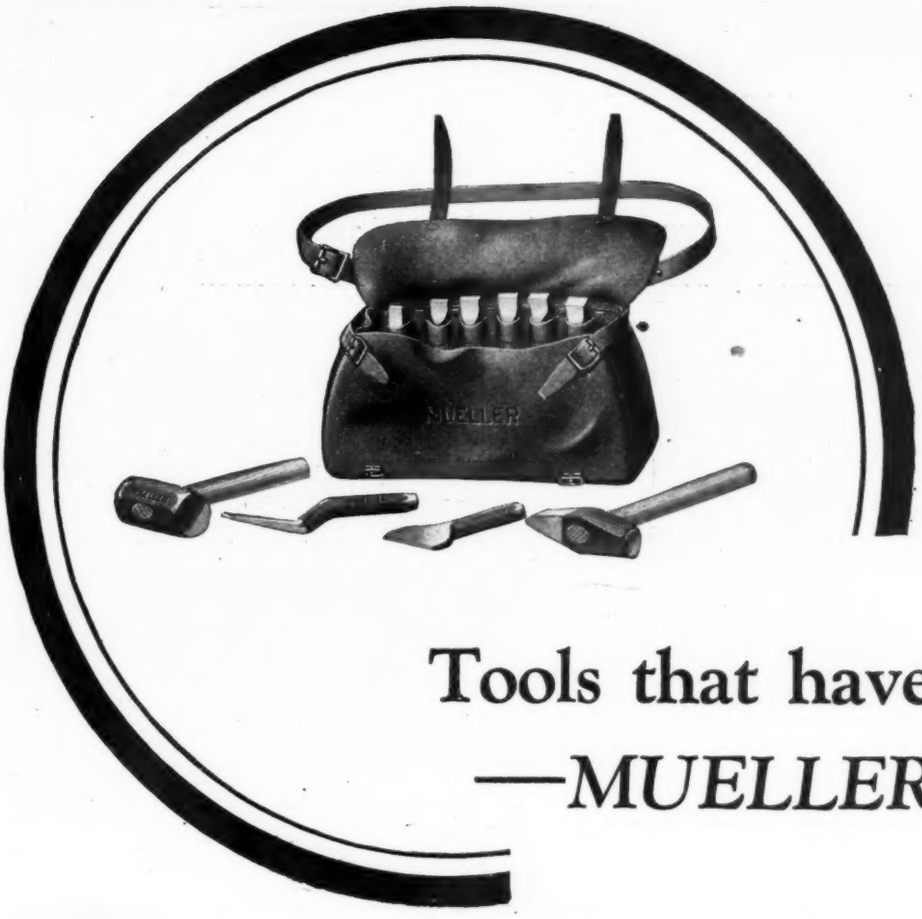
The capacity of the tanks, as a result, was more than doubled; and a great saving in labor was effected.

Link-Belt Sludge Collectors are made to suit your individual conditions. Their durable construction and long life; their convenient accessibility for inspection; their simple and complete efficiency—all these things make for their entire suitability to the largest or smallest plant. Send for Folder No. 849.

LINK-BELT COMPANY, 2045 HUNTING PARK AVE., PHILADELPHIA, PA. 2541

LINK-BELT

Sewage Disposal Plant Equipment



Water or Gas Main Caulking Set

The set of tools illustrated will meet all ordinary requirements for caulking mains 12" or smaller. The set is furnished regularly in a stout leather carrying bag.

Tools that have the *"feel"* —*MUELLER* Tools

MUELLER
Pipe End Reamer

For reaming the ends of cut pipe. Takes the burr from pipe ends smoothly and quickly. Three steel blades easily kept sharp. Ratchet handle easy to use. For reaming pipe up to 1¼ inches, specify G-10676; for sizes up to 3 inches, G-10675.

There is a big difference in tools. Some have that certain *feel*—the right heft and balance —you know you can do a good job with them. Mueller Tools have the *feel.* There's a reason—just this: Mueller tools are designed by men who use them, veterans who know what they should be, and they are tried out for months by men who are out on the job. That's why you know, when you pick it up, that a Mueller tool will do the job quickly and with the least effort.

Write for Mueller's special catalog on tools for gas companies.

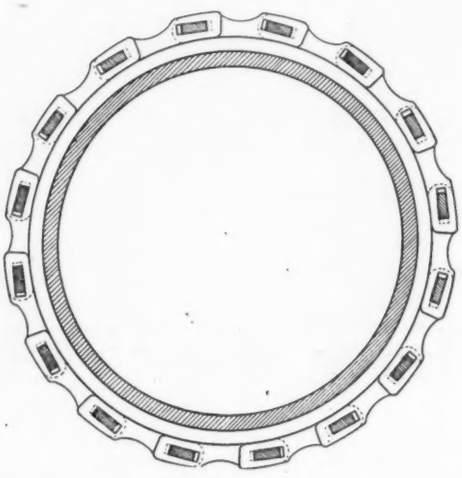
MUELLER CO. (Established 1857) Factories: Decatur, Illinois; Port Huron, Michigan
Branches: New York, San Francisco, Los Angeles. Canadian Factory: MUELLER, Limited, Sarnia

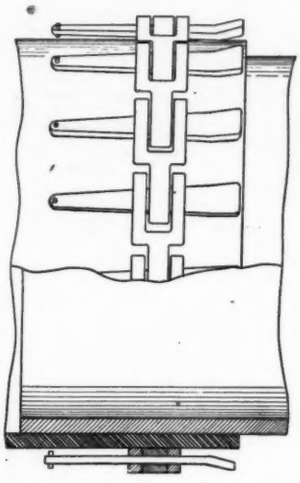
MUELLER

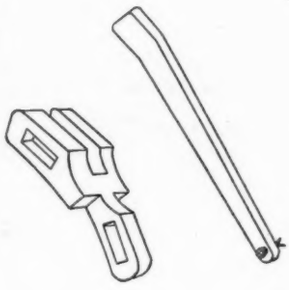
328

PATENTED LINK PIPE CLAMP *for* DREDGING CONTRACTORS

Grips the Sleeve All Around—Fits Any Size Pipe
Easily Attached—Easily Removed—No Wrench Needed







One Link
One Wedge
One Cotter Pin
35c
F.O.B. Factory

PHILIPS & DAVIES, KENTON, OHIO

Our more than thirty years' experience enables us to select materials and design equipment which will render the best service. The number of Buffalo-Springfield Rollers now in use is not equalled by that of any other make of roller produced in America or abroad.

Manufactured in all types and sizes, steam and motor. Get full particulars regarding them.

The Buffalo-Springfield Roller Co.
Springfield, Ohio

BUFFALO-SPRINGFIELD ROLLERS

Nearing the North Shore. Showing the dredger, pile drivers and cradle.

U.S. Flexible Joint Pipe for Submarine Lines

The installation shown here was made for the Delaware River Water Company by Frederick Snare Corporation of New York and Philadelphia.

The line, which consists of 64 lengths of our 16" Flexible Joint Pipe, was laid under adverse tide conditions at a maximum depth of 26' at high tide.

Under the water pressure test only four small leaks developed and these were easily recaulked by a diver. The water was then pumped out and an air pressure of 125 lbs. per square inch put on the line and maintained without evidence of leakage anywhere.

Write for United States Cast Iron Pipe handbook—it contains descriptions of all types of flexible joint pipe.

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 975 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.

Can You Imagine a More "Universal" Crane

Universal as to Mounting

(A Universal fits any of these and is readily transferable from one to another.)

Motor Truck
Center Drive Crawler
Heavy Duty Trailer
Railroad Flat Car
Industrial Yard Truck
Portal Pier

"A Mounting for Every Job Condition."

Universal in Application

Clamshell Bucket
Dragline Bucket
Pull Shovel
Backfiller Board
Snow Bucket
Post Hole Digger
Electric Magnet
Hook Block

"An Attachment to Every Job."

See It at the Chicago Road Show—Jan 10-14, '27

The Universal is all the name implies—"Universal" as to mounting and in application. It possesses Speed, Reliability and Adaptability—factors that make for Reliable Money Making Performance. See this proven crane at the Chicago Road Show—or if you won't be there, write now for BULLETIN 36-U.

The UNIVERSAL CRANE CO., 944 Swetland Bldg., Cleveland, O.
"LARGEST AND ONLY EXCLUSIVE BUILDERS OF TRUCK CRANES"

C.H.&E.

PUMPS

The larger cities are standardizing on C. H. & E. Single and Double Diaphragm Pumps, as well as our Centrifugal Pumps with capacities from 6,000 gallons up to 80,000 gallons per hour. Over 300 C. H. & E. Mud-hen Diaphragm Pumps were sold in the State of Florida last year.

Less gears are found in C. H. & E. Pumps than any other power driven pump now on the market. This means less break-down and service on the job.

Our representatives in all parts of the United States carry these pumps in stock for immediate delivery to your job.

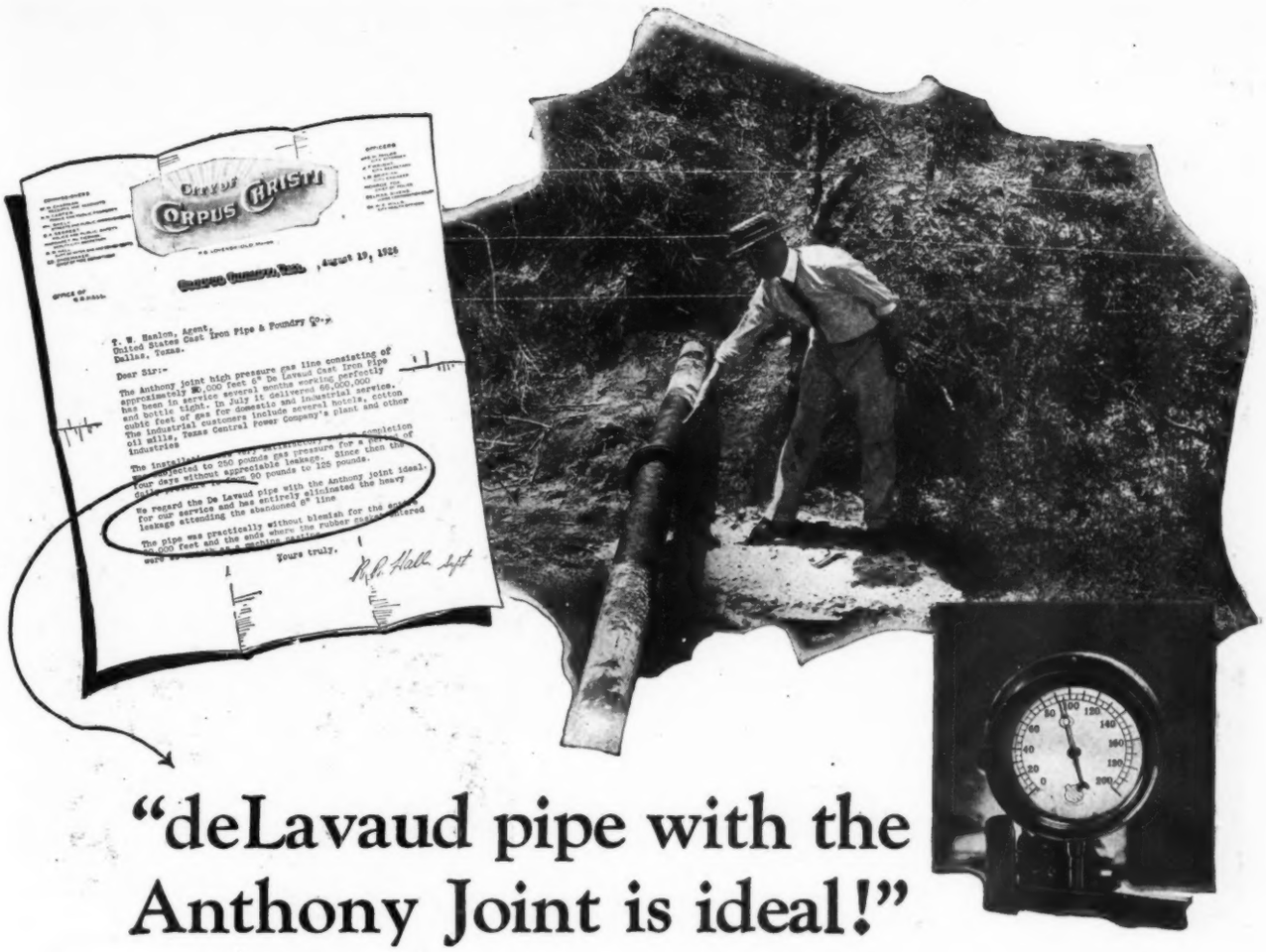
Wire us at our expense for the name of the representative nearest you.

C. H. & E. 4" Mud-hen Pump

Manufactured by

C. H. & E. MANUFACTURING CO., INC.

Clinton and Mineral Sts., Milwaukee, Wis.


CITY OF
CORPUS CHRISTI
August 19, 1926
P. W. Hanlon, Agent,
United States Cast Iron Pipe & Foundry Co.,
Dallas, Texas.
Dear Sir:-
The Anthony joint high pressure gas line consisting of
approximately 30,000 feet 6" De Lavaud Cast Iron Pipe
has been in service several months working perfectly
and bottle tight. In July it delivered 66,000,000
cubic feet of gas for domestic and industrial service.
The industrial customers include several hotels, cotton
oil mills, Texas Central Power Company's plant and other
industries
We regard the De Lavaud pipe with the Anthony joint ideal.
for our service and has entirely eliminated the heavy
leakage attending the abandoned 6" line
Yours truly.

"deLavaud pipe with the Anthony Joint is ideal!"

30,000 feet of pipe under a daily gas pressure of 90 to 125 pounds

THE progressive city of Corpus Christi, Texas, with its fine new Port, gives this unqualified endorsement of deLavaud Centrifugal pipe and the Anthony Joint.

There are nearly 2,000,000 lengths of deLavaud in use today.

Write for special literature covering the uses, advantages and specifications of deLavaud Centrifugal pipe.

United States Cast Iron Pipe and Foundry Company

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
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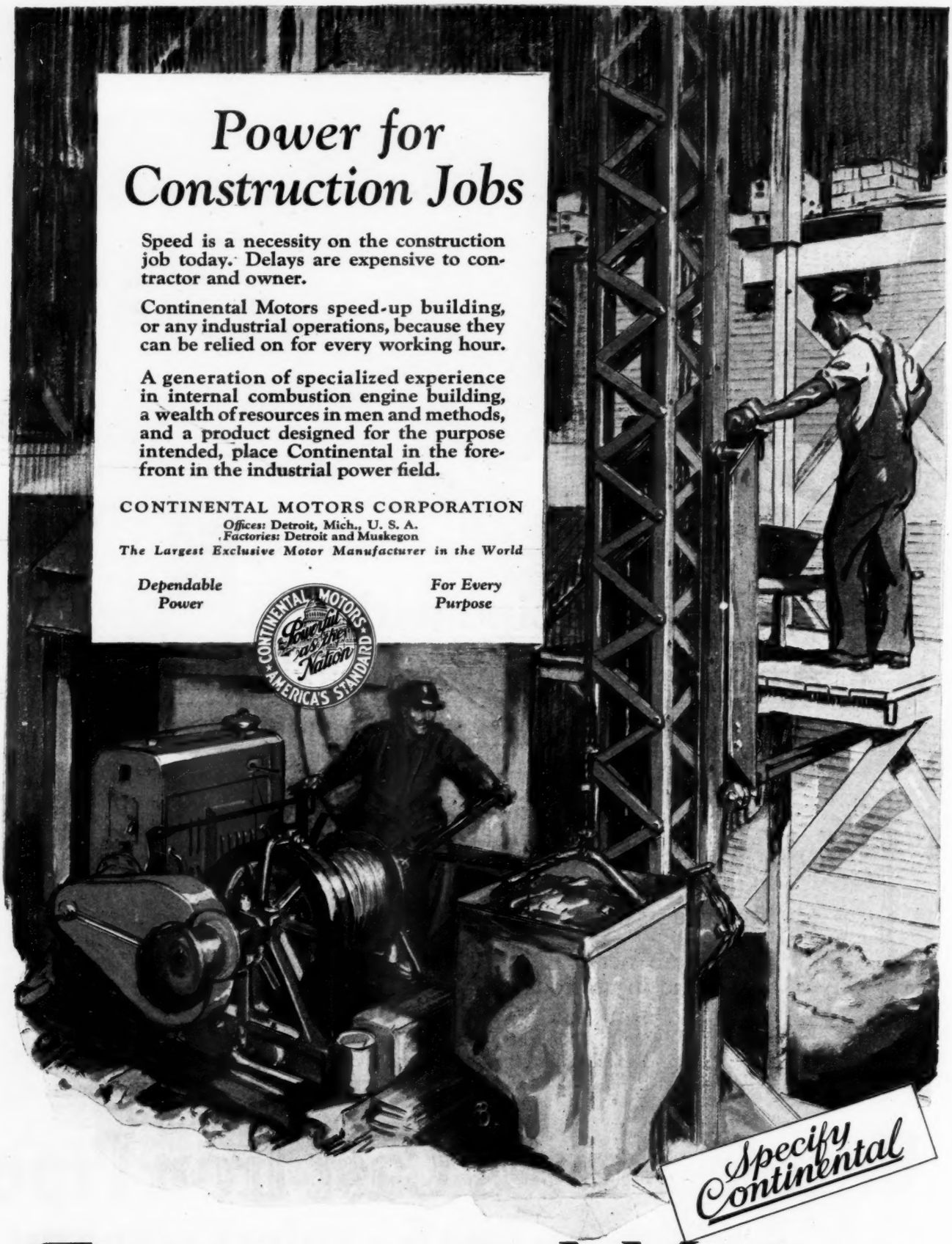
Cleveland: 1150 East 26th Street
Minneapolis: 6th St. & Hennepin Ave.
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.

General Offices:
Burlington, New Jersey


Power for Construction Jobs
Speed is a necessity on the construction job today. Delays are expensive to contractor and owner.
Continental Motors speed-up building, or any industrial operations, because they can be relied on for every working hour.
A generation of specialized experience in internal combustion engine building, a wealth of resources in men and methods, and a product designed for the purpose intended, place Continental in the forefront in the industrial power field.
CONTINENTAL MOTORS CORPORATION
Offices: Detroit, Mich., U. S. A.
Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World
Dependable Power
For Every Purpose
CONTINENTAL MOTORS
Powerful as the Nation
AMERICA'S STANDARD
Specify Continental
Continental Motors

Section of Hartford Pike, Rhode Island, paved with TEXACO Asphalt in 1916.

Greenwood-Apponaug Road, Rhode Island, paved with TEXACO in 1915.

View of Putnam Pike, Rhode Island. TEXACO pavement in service since 1916.

Ten Years Old

but as inviting as when first laid

The time to inspect a pavement is ten or eleven years after construction. And while inspecting it, also consider its maintenance cost during those ten years. Then you can decide with certainty whether it is the pavement for your street or highway.

Here are three important highways of the State of Rhode Island, all paved with TEXACO Asphalt. They have completed their first ten years' service, and as the photographs clearly indicate, are still as smooth and attractive as when first laid. Of maintenance these routes have required little or none in their long service.

Practically every State east of the Rocky Mountains is today being served by TEXACO Asphalt highways—whose unchanging smoothness is their mark of quality.

TEXACO

New York
Philadelphia
Richmond
Boston
Jacksonville

The Texas Company
ASPHALT SALES DEPT.
17 Battery Place, New York City

Chicago
Cleveland
Kansas City
Houston
Dallas

Owners' actual records of White mileages-

72 Whites have run **500,000** miles and more each

384 have run between **300,000** and **500,000** miles each

951 have run between **200,000** and **300,000** miles each

1658 have run between **150,000** and **200,000** miles each

4959 have run between **100,000** and **150,000** miles each

giving the astounding total-

8024 Whites have run **100,000** miles and more each

No owner will operate a truck or bus long enough to run 100,000 miles, unless those miles are *money-earning miles*

100,000 miles—White miles—mean more than an exceptionally long distance; more than an exceedingly durable, well-built, well-serviced motor truck or bus.

They mean unusual profits. They mean net earnings—in excess of all costs. They mean continued earnings long after the original cost has been written off the books.

200,000 miles mean all that—doubled. 300,000 miles mean all that—trebled. So on . . . . Picture the earnings of the scores of Whites that have exceeded 500,000 miles. Then picture what these mileages would mean in your own business, knowing your average mileages for a week or a month or a year.

White 100,000-mile records are not isolated performances, not special achievements under especially favorable conditions. Whites, by the thousand, exceed 100,000 miles with a regularity that makes it standard performance. . . . . All models do it. They do it in all lines of business. They do it everywhere, under all conditions of load, road, weather and climate. They do it in fleets and in single installations.

More than 8,000 Whites have run 100,000 miles and more. More than 1,400 have run 200,000 miles or more. More than 400 have exceeded 300,000 miles. The original cost of most of these 8,024 Whites has been written off the owners' books. . . . . And these mileages are actual owners' figures. They do not include many hundreds of additional Whites that have passed 100,000 miles, but whose owners have not sent us accurate records. Neither do they mirror the splendid earning records of thousands of Whites that have been serving dependably for ten, twelve, fourteen years, carrying their pay loads, without reaching the 100,000-mile mark.

This record, published annually, stands alone. No other truck manufacturer has ever published such a volume of evidence of dependability, long life and continuous earning power. No other truck manufacturer can.

THE WHITE COMPANY, CLEVELAND

Our new "300,000 Miles and More" booklet is just out, with the names of all the owners and the number of Whites each owns in each mileage classification. You will find leaders in all industries, firms in your own line of business, your neighbors, your business associates. We will gladly send the booklet free. Write for it.

Before you buy a truck or a bus see the Whites at any of our 75 factory branches or 500 dealers. There is a White model to meet every transportation need.

Truck Chassis

Model 15	— ¾-Ton	$2,150
Model 20	— 2 -Ton	2,950
Model 51	— 2½-Ton	3,750
Model 40-A	— 3½-Ton	4,350
Model 52	— Heavy Duty	5,100

(Several types of power dumping bodies and hoists available)

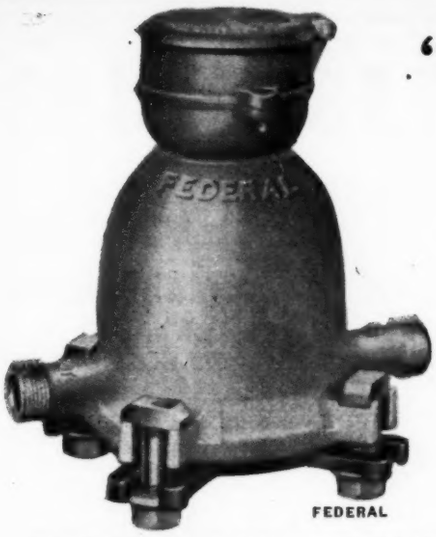
Bus Chassis

Model 53	16 to 21 passengers	$4,250
Model 50-B	25 to 29 passengers	5,350

(All prices f.o.b. Cleveland)

WHITE TRUCKS

AND WHITE BUSSES



FEDERAL

"FEDERAL"

A BETTER FROST PROOF METER

All sizes comply with Specifications of the American and New England Water Works Associations.

FEDERAL A

The 'Federal" Meter is designed to meet the demand for a better water meter, better in design, better in construction, better in quality and best in workmanship. These improvements are the result of exhaustive investigation, experiments and tests by specialists of wide experience.

The meter is made frost proof by a breakable cast iron bottom entirely rust proof, and fastened to the main casing by bronze bolts and nuts.

The measuring chamber is not distorted by freezing. If the meter is frozen, the frost bottom breaks and instantly liberates the measuring chamber unharmed.

It can be more easily and quickly taken apart and re-assembled than any other meter on the market. The mere removal of the casing nuts completely releases the entire internal mechanism.

Write for Literature and Prices.

The Federal Meter Corporation

MANUFACTURERS OF

HIGH CLASS WATER METERS

EAST ORANGE, N. J., U. S. A.

SCHRAMM, INC.

SHOWING SEVERAL OF THE TEN "SCHRAMM" 100 CU. FT. TRACTOR DRIVEN COMPRESSORS OWNED BY THE PENNA. STATE HIGHWAY DEPARTMENT. ON ROAD WORK.

THESE OUTFITS HAVE BEEN WORKING CONSISTENTLY FOR TWENTY-EIGHT MONTHS DURING WHICH PERIOD THE STATE HIGHWAY DEPARTMENT SPENT ONLY $22.85 FOR REPAIRS.

SCHRAMM, INC., MANUFACTURERS, WEST CHESTER, PA.

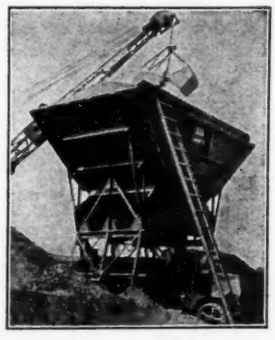
OFFICES AND REPRESENTATIVES IN ALL PRINCIPAL CITIES

SCHRAMM, INC.

JOHNSON DEMOUNTABLE BINS
BATCH MEASURING HOPPERS
Complete Erection in 45 Minutes

THE PRACTICAL BINS—ASSEMBLED UNITS—INTERLOCKING—NO BOLTING

Scale attachments for weighing Sand and Stone. Dial reading—no balancing—instant action—interchangeable with volume type hoppers.



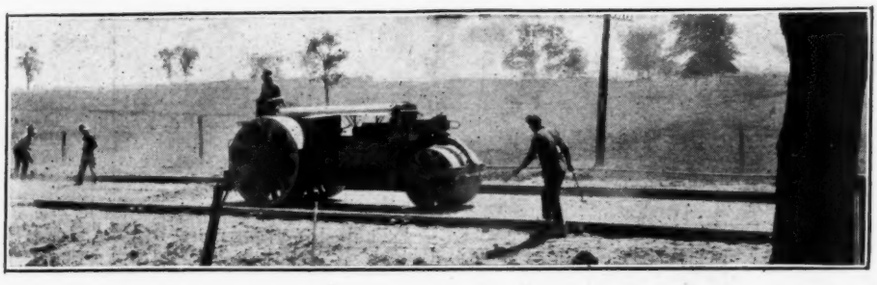
The Round, Simple, Reliable Batch Hopper.

Hoppers with no square corners mean accuracy. The only Jam Proof Bin Valve for stone. No Ropes to wear and break. No Latches to fail to hold. Visual Check on complete filling. Fitted to Wood Bins with one-fourth the expense of other makes. Levers at Operator's Convenience and no extra valve operator required.

C. S. JOHNSON COMPANY, CHAMPAIGN, ILL.

For more information write us or tear out this ad, sign name and address and mail.

THE HUBER *4-Cylinder* MOTOR ROLLER



Vibrationless
Dependable
No Shifting Gears
Roller Bearings
Transmission Gears
Encased—Running in Oil

Send for Illustrated Motor Roller Book

THE HUBER MANUFACTURING CO.
325 E. CENTER STREET **MARION, OHIO**

"MATHEWS"
(REG. U.S. PAT. OFF.)
FIRE HYDRANTS

Recognized Standard for Over 50 Years

GATE FOOT AND CHECK VALVES

"Reduced" Fittings

CAST IRON PIPE
For water and gas

R.D. WOOD & CO.
Established 1803
PHILADELPHIA, U.S.A.

ASPHALT PLANTS
PORTABLE,
STATIONARY, RAILROAD,
SAND DRYERS
Either Direct Heat or Internal Flame
The
J. D. FARASEY MFG. CO.
CLEVELAND, OHIO

TRADE MARK
DOWNIE
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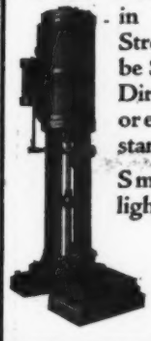
DEEP WELL PUMPS

Downie Deep Well Pumps are offered for Heavy, Continuous Service in Deep Artesian Wells. They are built in Double and Single Stroke Models and may be Steam Driven, Belted, Direct Geared to Motor, or equipped for any other standard form of drive.



Smaller Pumps for lighter service.

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Downie Centrifugals, single and multi-stage, Catalog 801.

Keystone Driller Company
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GAMON METER COMPANY
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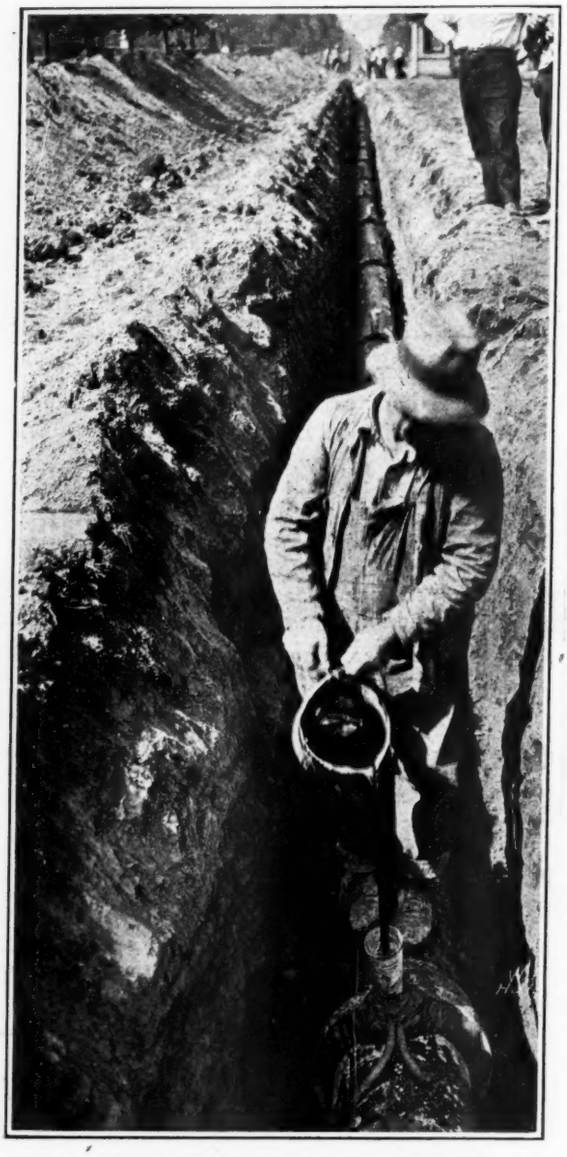

Pouring LEADITE Joints on line of 12-in. c. i. bell and spigot water main.

Durable Pipe Joints

The wise man builds for the future. Supply lines and distribution systems are usually permanent installations.

Durability and quality should be the first consideration of the product used for making joints in cast iron bell and spigot water mains.

LEADITE is a good product and the leader in its field, because it has gained and retained the recognition, support and patronage of such a great number of water works men for so many years.

LEADITE has been tested and used for over 30 years, under all pressures and conditions, by water works, railroads, mines, contractors and industrial plants throughout the country.

Thousands of miles of pipe have been laid with LEADITE joints, on all sizes from 4 in. to 60 in. in diameter.

LEADITE takes the drudgery out of pipe laying; saves time, money and labor; makes flexible joints; makes joints which will stand vibration under tracks, over and under bridges; makes joints which resist electrolysis; eliminates large bell holes; reduces trench pumping and other work incidental to caulking—LEADITE requires no caulking.

Every water works man abreast of the times knows about LEADITE. LEADITE is an interesting and familiar topic at water works conventions and wherever water works men congregate.

The up-to-date water works man specifies and uses LEADITE.

LEADITE saves at least 75%.

LEADITE is the pioneer self-caulking material for c. i. pipe

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1512 Land Title Building, Philadelphia, Pa., U. S. A.

NO CAULKING

INDUSTRIAL LITERATURE

DESCRIBING MATERIALS AND EQUIPMENT FOR CONSTRUCTING, OPERATING AND MAINTAINING PUBLIC IMPROVEMENTS.

You can obtain the catalogs listed on this and the following pages by using the form at the bottom of this page or by writing to the company direct, giving the catalog number and mentioning PUBLIC WORKS.

CONTRACTORS' EQUIPMENT

Air Compressors

1. Air Compressors, portable Motor Driven, Stationary, Portable Belt Driven, Portable Tractor Combination are fully described and illustrated in a 32-page and cover catalog issued by Schramm, Inc., West Chester, Pa.

2. Sullivan Machinery Co., Chicago, has a new catalog describing portable air compressors, including WK-312, two cylinder gas engine driven; WK-314, four cylinder gas engine driven; WK-34, Fordson belt driven; WK-32, electric motor driven—Bulletin 77-N, 16 pages, 6x9.

4. Portable Air Compressors for every compressor job and for various mountings are illustrated and described with specifications in a foller by The Buhl Company, 407 South Dearborn St., Chicago.

5. Domestic Engine & Pump Co., Shippensburg, Pa. Portable and compressors for all construction and building needs, illustrated. Mounting and detailed specification of types given. 12 pages, 8x9½.

6. Ingersoll-Rand Portable Compressors are built in the sizes as gasoline engine or electric motor driven units. There are various styles of mountings or furnished without running gear. Ingersoll-Rand Co., 11 Broadway, New York. Bulletin 3415.

Asphalt Plants

10. J. D. Farasey Mfg. Company, Cleveland, Ohio, issue folders of specifications for Farasey Portable Asphalt Paving Plants. These R. R. 1-car plants have easy capacity of 2,250 yards, 2" surface per 8 hours.

Admixtures for Concrete

15. Data on the use of Celite as an admixture in concrete for improving workability, uniformity and water-tightness are contained in Bulletin 314 of the Celite Products Company, 11 Broadway, New York City.

16. Specification clauses for architects and engineers covering diatomaceous silica for its use as an admixture as well as directions for the use of Celite are given in Bulletin 317 of the Celite Products Company, 11 Broadway, New York City.

Branding Irons

18. The Everhot Mfg. Co., Maywood, Illinois, publish descriptive literature of their gas and electric branding equipment for branding contractors' tools, etc.

Concrete Accelerators

20. "How to Cure Concrete," a forty-seven-page manual published by the Dow Chemical Company, Midland, Michigan, treats fully the subject suggested by its title. A well-illustrated and instructive volume.

Concrete Mixers

25. Koehring Company, Milwaukee, Wisconsin, have a new illustrated and descriptive catalog on the 7-S Dandie Mixer. Every detail and feature of construction is shown with complete description.

26. The American Cement Machine Company, of Keokuk, Ia., describes tilting mixers manufactured by it of various capacities up to size 7 and mounted on two or four wheels. 8 pages. 8½x11.

27. Concrete Mixers manufactured by the Jaeger Machine Company, Columbus, O., described in booklet. 32 pages, 6x9.

28. Koehring Company, Milwaukee, Wisconsin. Catalog showing complete line of paving mixers manufactured in sizes of 7E, 13E and 27E.

29. Koehring Company, Milwaukee, Wisconsin. Illustrated 48-page catalog on construction mixers giving complete specifications of 10S, 14S, 21S and 28S sizes.

30. A broadside graphically describing four new concrete tilting-mixers with capacities ranging from 25 to 120 cu. yds. per day, will be mailed on request by T. L. Smith Co., Milwaukee, Wis.

31. Koehring Company, Milwaukee, Wisconsin. Have new specifications catalog on concrete paver No. 7E and construction mixer No. 21S, also a descriptive folder on paver No. 13E.

Concrete Heaters

35. In bulletin 42, Aeroil Burner Co., Hudson Ave., Union City, N. J., describes heaters for concrete in drum during winter, also thawing torches for melting ice on construction jobs and portable water heaters.

Chutes and Towers, Concrete

40. The Insley Manufacturing Company, of Indianapolis, describes concrete chutes in connection with steel towers and Mast Hoist Plants in Catalogs 44 and 45. 95 pages and 16 pages, 8x11.

41. The Insley Manufacturing Company of Indianapolis describes steel towers and steel masts in connection with chutes for placing concrete, in Catalogs 44 and 45. 95 pages and 16 pages, 8x11.

42. The Gruendler Patent Crusher and Pulverizer Co., St. Louis, Mo., publish an interesting booklet on Rock and Gravel Crushing equipment.

Dredges

45. The Bay City Dredge Works, Bay City, Mich., issue Catalog D, describing Bay City Land Dredges for canal and open ditch excavation or cleanout and ditch maintenance work. Oil engine operated. 72 pages, 6½x10.

Drills

50. Sullivan Machinery Company, Chicago, builds its Rotator Type hand-held hammer drills in seven models for many rock drilling purposes. One is a steam engine. Bulletin 81-F, 32 pages, 6x9.

Drills, Tunneling, Water, Jet

55. Sullivan Machinery Company, Chicago, has a new catalog, No. 81-E, describing its DW-64 water jet tunnelling drill. 135 lb. weight. May be used on tripod or bar for down holes to 32 ft., or as 90 lb. hand drill with suitable handles. 16 pages, 6x9.

Dump Bodies, Steel

60. Ford Truck Steel Dump Bodies and hydraulic hoists are manufactured by the Wood Hydraulic Hoist & Body Company, 4196 Bellevue Ave., Detroit, Mich.

61. Mandt 100% trouble-proof automatic dump bodies for garbage, charging pavers and all contractors' uses. Catalog 9x11. The Mandt Company, Keokuk, Iowa.

62. "Hoists, Dump Truck." Double the Truck's Value by using power operated Hydraulic Hoists. Catalog of WOOD Hydraulic Hoist and Body Company, Detroit, Michigan, describes Hydraulic Hoists for every make and model of Truck.

63. "Dump, Bodies, Steel." WOOD Hydraulic Hoist & Body Co., Detroit, Mich., manufacturers all Steel Dump Bodies for every hauling proposition and Self-Dumper Bodies for road builders Trucks. Special Bulletins.

Engines

65. Climax Engineering Co., Clinton, Iowa, 4 and 6 cylinder engines for Road Building. Hoists, Tractors, Air Compressors, Excavators, etc., described in Bulletins A, B, C, D and H.

Hoppers, Measuring

70. The C. S. Johnson Co., Champaign, Ill., publish a folder which describes the Johnson Demountable Bins and Measuring Hoppers. Sent on request.

Loaders and Unloaders

54. The Chicago Automatic Conveyor Co., Old Colony Bldg., Chicago, Ill., issue literature describing Portable Conveyors with Non-Clogging Receiving ends. Sent on request.

75. The Universal Road Machinery Company, Kingston, N. Y., issues two bulletins describing the Reliance Portable Car Unloader and Reliance Chip and Sand Spreader.

80. Link-Belt Company, Philadelphia, the originators of Portable Loaders, have issued a folder giving recently reduced prices on the famous "CUB" Loader (belt type), and the Type "C" bucket loader, with condensed information on other popular types.

81. An interesting book describing Link-Belt Rivetless Chain, replete with illustrations, supported by tables of weights and strengths, the advantageous uses on conveyors, elevators, etc. Address the Link-Belt Co., Chicago, Philadelphia or Indianapolis.

82. Car Loaders. The Heltzel Bulletin No. 8 describes car unloaders and other contractors' equipment.

Motor Trucks and Tractors

85. An illustrated pamphlet picturing American-LaFrance commercial trucks in actual service with contractors, builders and allied lines, issued by American-LaFrance Fire Engine Co., Elmira, N. Y.

86. A catalog illustrating and describing American-LaFrance commercial trucks at completely manufactured by the American-La France Fire Engine Company in their modern plant at Bloomfield, N. J.

87. The Ford Motor Company issues a monthly magazine, The Fordson, dealing with agricultural uses of the Fordson Tractor. 16 pages, 8¼x11¼.

88. The Ford Motor Company issues a monthly magazine, Power & Haulage, dealing with industrial and commercial uses of the Fordson Tractor and Ford Truck. 16 pages, 7½x10¼.

89. The General Motors Truck Company, Pontiac, Mich., issues a booklet illustrating the service of GMC trucks in road construction and maintenance. "Money Saving Transportation." 16 pages, 8x11.

90. Specifications by parts of GMC trucks, motor and chassis are given in a booklet, "General Motors Trucks," issued by the General Motors Company, Pontiac, Mich. 48 pages, 8x11.

91. The Huber Mfg. Co., Marion, Ohio, issues bulletins, "Huber Tractors" and "The Huber Scarifier." Illustrations of machines in operation and testimonials from users.

92. "Kerosene Power, the Low-Price Road Builder," bulletin by the International Har-

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Gentlemen:

Please send me the following catalogs listed under Industrial Literature Section

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.....NAME..... .....STREET ADDRESS..... .....CITY.....

vester Co., Chicago, shows economy of kerosene tractors. Illustrations, specifications, and figures on cost of operation.

93. "There Is a Definite Reason for Every Road Building Success," issued by International Motor Company, 25 Broadway, New York, tells how three big operations were handled and reasons for success.

94. "Earth Moving and Hauling of Building and Road Materials," 32-page illustrated booklet showing part of motor trucks in highway building and bulk hauling. International Motor Company, 25 Broadway, New York.

95. Highland Open-for-Summer or Completely-Closed-for-Winter Cab Bodies are built for all conditions of speed wagon or truck service. Bulletins. Highland Body Mfg. Company, Elmwood Place, Cincinnati.

Paving Gauges

74-A. The Roughen Adjustable Paving Gauge Co. of Fond du Lac, Wisconsin, issues a large broadside containing more than a score of photographic illustrations showing the use of their highly efficient paving gauge.

Pumps, Contractors'

100. The Edson Manufacturing Corporation, Boston, describes its improved designs in diaphragm pumps, both hand and power; odorless force pumps, and suction hose for the same and other pump accessories. 9 pages, 8½x11.

101. Domestic Engine & Pump Company, Shippensburg, Pa. Centrifugal, diaphragm and trench force pumps described and illustrated. Specifications by parts of electric-driven pumps and gas power units. 8 pages, 8x9½.

102. Bulletin No. 56, illustrating the Barton Portable Pump and its attachment to automobile motors, describing the simplicity of operation and its many practical uses, issued by the American Steam Pump Co., Battle Creek, Mich.

103. The construction usese and proved performance of the Nye New Model High Pressure Pump, fully illustrated and described in Catalogue No. 20. Nye Steam Pump & Machinery Co., 701 N. Western Ave., Chicago, Illinois.

104. In a 160-page catalog Aldrich Pump Co., Allentown, Pa., describes and illustrates Road, Deep Well and other pumps for every service. When interested in pumps write for this catalog.

105. Humdinger Diaphragm force pumps open discharge diaphragm pumps, triplex road pumps and portable centrifugal pumps described and illustrated in bulletin No. 102. Ralph B. Carter Co., 152 Chambers Street, New York City.

Pumps, Contractors'

106. C. H. & E. Manufacturing Co., Clinton and Mineral Streets, Milwaukee, Wis. Diaphragm pumps both single and double action. Trench force pumps and centrifugal pumps. Illustrated bulletins mailed on request.

Road Finishing Machines

110. The Heltzeel Steel Form & Iron Co., Warren, Ohio, publish a treatise of finishers, strikeoffs and graders, including descriptions of hand finishers, automatic strikeoff and grader.

Road Rollers, Scrapers, Graders, etc .

111. "Modern Road Building with Adams Adjustable Leaning Wheel Graders," a 56-page book issued by J. D. Adams & Company, Indianapolis, Indiana, catalogues graders in 6½, 7, 8, 10, and 12-foot blade sizes, road plows, rooter plows, drag scrapers, fresnos, wheeled scrapers, etc. All sizes of graders are profusely illustrated by action pictures and the entire book contains much of interest to road contractors.

112. Everything for the Road Maker. Good Roads Machinery Co., Kennett Square, Pa., issue a 48-page catalogue describing complete line of Road Graders, Rock Crushers, Road Drags, Road Rollers, Oiling Machinery and Culvert Pipe.

113. The Buffalo Springfield Roller Company, Springfield, Ohio. Pocket size booklet with return card, showing all types of Buffalo Springfield steam and motor rollers and scarafiers. 20 pages, 6¼x3½.

114. Road Machinery of all kinds is manufactured by the Austin-Western Road Machinery Company, Chicago. Special features of graders, scarifiers, crushers, elevators, sprinklers, culverts, etc. Catalog 24. 64 pages, 9x12.

115. The Russell Grader Manufacturing Company of Minneapolis issues an illustrated catalog of its road machines, planers, finishers, drags, scrapers, etc. Printed in two colors and handsomely gotten up. 68 pages. 8½x11.

116. Acme Road Machinery Co., Frankfort, N. Y., issues descriptive bulletins of gas and steam rollers, rock crushers, graders and other road building machinery.

117. The Austin-Western Road Machinery Company, of Chicago, issues a catalog entitled, "The Austin-Western Line," describing graders, scrapers, screens, rollers, scarifiers, etc. 64 pages, 9x12.

118. Self-loading Scrapers, Baker Maney, 1¼- and ¾-yard models described and photographs of trains two to six behind tractors. Catalog 209, Baker Mfg. Company, 525 Stanford Avenue, Springfield, Illinois.

119. Quick ditching, filling and grading at big savings of money and time by Byers Bear Cat all-purpose light cranes. Described in new catalog by Byers Machine Co., Ravenna, O.

120. Rock Crushers, Elevators, Conveyors, Screens and Bins. The Good Roads Machinery Co., Kennett Square, Pa., issue a 36-page illustrated book describing Champion Rock Crushers, attachments for same and portable and stationary rock crushing plants.

121. A large line of stationary or portable stone crushers and screens for light and heavy duty are described in illustrated folder 124-M by the Universal Crusher Co., Cedar Rapids, Iowa.

122. The Galion Iron Works and Manufacturing Company of Galion, Ohio. New illustrated bulletins on their Master Four Cylinder Motor Roller, Four Cylinder Tandem Roller, International Motor Roller and International Motor graders.

Sand and Gravel Washing Plants

130. Link-Belt Co., Chicago, issues a seventy-page catalog giving complete information regarding Sand and Gravel Washing Plants, stationary and portable. Those interested in such equipment should have a copy.

Wheelbarrows

135. The Toledo Wheelbarrow Co., Toledo, Ohio, issue catalogs describing Bull Frog Wheelbarrows, Carts and Scrapers for all purposes. Sent on request.

Steam Shovels, Cranes, Excavators

139. Speeder Machinery Corp., Fairfield, Iowa, in their bulletin J26, describe Speeder Shovels, Cranes and Draglines. Copy sent on request.

140. The Bay City Dredge Works, Bay City, Mich., issue Catalogs 24 and 25, printed in two colors describing one-man operated, convertible gasoline or electric caterpillar mounted shovels for trench excavation and general material handling work.

145. Type V Full Revolving Truck Crane is described and illustrated in a new 32 page folder. The Crane swings completely around lifting heavier loads at longer distances. Orton & Steinbrenner Company, Chicago.

146. Harnischfeger Corporation, successor to Pawling & Harnischfeger, Milwaukee, describes fully the construction and operation of gasoline or electric powered shovels, draglines, skimmer scoops and cranes. 34 pages, 8½x11.

147. Harnischfeger Corporation, successor to Pawling & Harnischfeger, Milwaukee, Wis., describes fully the construction and operation of ¾ and 1 cu. yd. gasoline or electric shovels. 34 pages, 8½x11.

148. The Insley Mfg. Co., Indianapolis, Ind., issues special booklets on portable gas unit excavators, concrete construction and contractors' equipment.

149. Koehring Company, Milwaukee, Wisconsin. Catalog giving complete specifications, working dimensions and illustrations on the Koehring No. 1 Gasoline or Electric Shovel, Crane and Dragline.

150. Sewer and trench excavating units, clamshell and dragline shovels, involving deck and railroad type excavators, are illustrated in a series of bulletins by the Osgood Company, Marion, Ohio.

151. The Orton & Steinbrenner Co., Chicago, issue catalog No. 20, describing construction, equipment and operation of 7 and 12-ton crawling tread and road wheel locomotive cranes.

152. "Mr. Barber's Scrapbook," a booklet issued by the Barber-Greene Company, Aurora, Illinois, contains interesting data on efficiency of Barber Greene trenchers and conveyors at various jobs.

153. "Contracting With Barber-Greenes," a 24-page booklet showing B. G. conveyors and ditchers loading wheelbarrows and cars, hauling material, pouring wet concrete, excavating, etc. Barber-Greene Company, Aurora, Ill.

154. "Cutting Mains and Services With a Barber-Greene Trencher," booklet by the Barber-Greene Company, Aurora, Ill., illustrates B. G. trenchers cutting services, straddling mains, passing obstructions, backfilling, etc.

155. Crawler and Locomotive Cranes, with Grab Bucket, Hook Block, Pile Driver, Scrape Bucket, Steam Shovel Dipper, etc., are described in catalogs of 28 and 40 pages, issued by Link-Belt Co., Chicago.

Steel Forms

160. The Heltzel Steel Form & Iron Company, Warren, Ohio, issue a series of booklets describing Heltzel Curb and Gutter Forms, Steel Road Forms and Sidewalk Forms.

161. Road Forms. The Heltzel Bulletin No. 8 describes steel road forms and other contractors' equipment.

162. Curb and Gutter Forms. The Heltzel Bulletin No. 8 describes curb-and-gutter forms, straight curb and integral curb and base forms.

163. Sidewalk Forms. The Heltzel Bulletin No. 8 describes steel sidewalk forms and other contractors' equipment.

Tools, Pipe

170. Joseph G. Pollard Co., Inc., of 146 Raymond Street, Brooklyn, New York, issues catalogue illustrating Sulky derricks, lead melting furnaces, and all kinds of tools and equipment used in laying pipe.

GARBAGE DISPOSAL

175. The Sterling Garbage Destructor, a booklet recently published by the C. O. Bartlett & Snow Company, Cleveland, Ohio, describes the operation of the Sterling furnace and a typical installation, and illustrates plants in leading cities.

FIRE FIGHTING EQUIPMENT

180. Fire Fighting Apparatus of all kinds. Pumps and Equipment mounted on commercial chassis. Complete information on request. Waterous Fire Engine Works, St. Paul, Minn.

181. A catalog containing illustrations and specifications of all types of modern motor fire apparatus as manufactured by the American-La France Fire Engine Company, Elmira, N. Y.

182. The General Motors Truck Company, Pontiac, Mich., issues a booklet illustrating and describing newest features of GMC fire trucks and trailers. 25 pages, 8x11.

Modern Pumps for Motor Fire Apparatus

190. An illustrated booklet by the American LaFrance Fire Engine Company, Elmira, N. Y., which describes the relative merits of rotary, piston and centrifugal pumps for motor driven fire apparatus.

TRAFFIC SIGNALS AND SIGNS

192. Complete line of flashing traffic signals for road intersections, dead end streets, and safety zones also standard illuminated highway signs for day and night service for marking arterial highways, dangerous turns and railroad crossings are illustrated and described in bulletin issued by Interflash Signal Corporation, 120 Broadway, New York City.

LIGHTING SYSTEMS

Ornamental Lighting Standards

195. The Alabama Pipe Company, 342 Madison Ave., New York City, carry a line of Cast Iron ornamental lighting standards and are prepared to make up special design posts according to specifications. Literature on request.

Ornamental Street Lighting

200. Catalogue 8-B issued by the Westinghouse Electric and Manufacturing Company describes the complete line of ornamental street lighting equipment made by that company. Address the nearest district office.

Overhead Street Lighting

205. "City Zoning of Street Lighting" by Chas J. Stahl, is an article showing the advantages of properly planned street lighting. Write for Reprint 162 to the nearest district office of the Westinghouse Electric and Manufacturing Co.

Highway Lighting

210. Folder 4809. A four-page folder describing the Westinghouse Highway Lighting Unit which is specially designed to effectively illuminate interurban highways. Address the nearest district office. Westinghouse Electric and Manufacturing Co.

(*Continued on page 52*)

USE THE COUPON AT BOTTOM OF THE FIRST PAGE IN THIS SECTION

JAEGER

TILTING MIXERS

Mix Concrete in Zero Weather

IT IS no longer necessary to lay up your JAEGER in cold weather or use slow, costly methods of heating materials. Simple, inexpensive HEATER ATTACHMENTS are now furnished for all sizes of JAEGER MIXERS, from the little sidewalk size to the heavy duty outfit for skyscrapers. With this heater equipment you can economically mix concrete so hot that it stays warm in the forms—70° to 90°. Cuts Winter mixing costs in half.

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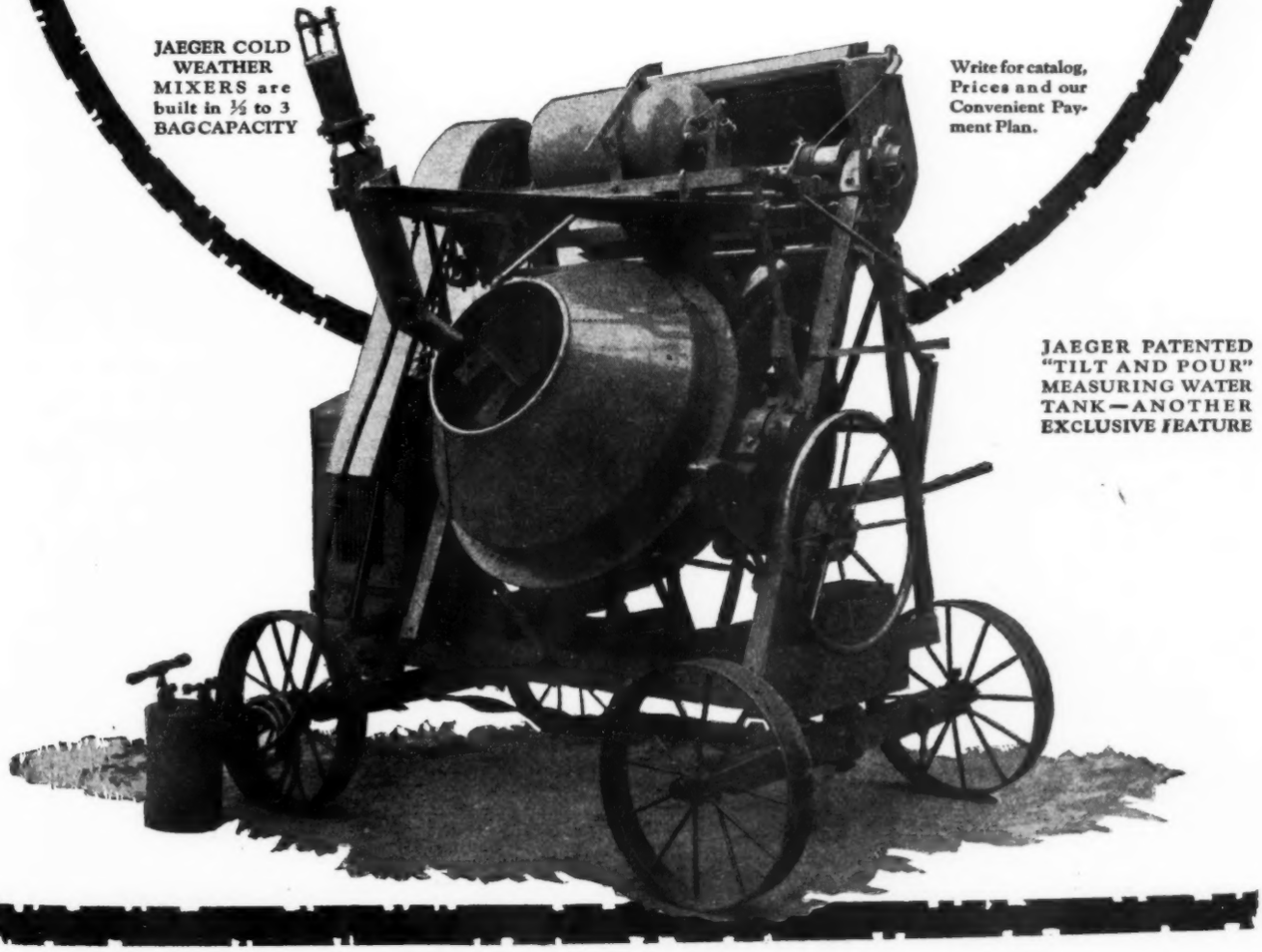


JAEGER PATENTED "TILT AND POUR" MEASURING WATER TANK—ANOTHER EXCLUSIVE FEATURE

PAVING MATERIALS

Asphalt

215. "From Maine to Miami," booklet by the Standard Oil Company of New York, illustrates well-known highways paved with Standard Asphalt Compounds, Standard Oil Company of New York, 26 Broadway.

Warrentite Bitulithic

220. All about Warrentite Bitulithic pavement for all road conditions described in 15 booklets of words and pictures. Scenic views and technical descriptions of famous highways. Warren Bros. Company, Boston, Mass.

Brick

225. "The A-B-C of Good Paving." Features of engineering involved and principles of brick paving. Published by the National Brick Paving Manufacturers' Association. 16 pages, 6x9.

226. Recommended Specifications for laying brick pavements are contained in a handy booklet by the National Paving Brick Manufacturers' Association, Cleveland, Ohio. 92 pages, 6x9.

Concrete Curing Compound

230. The Dow Chemical Company, Midland, Mich. "How to Cure Concrete" is a "manual of instruction on the curing of concrete pavements." A handy, useful volume, well illustrated. 47 pages, 5½x7½.

231. The Dow Chemical Company, Midland, Mich. "How to Maintain Roads" is a manual of information on road building and maintenance. Contains tables of composition, grading, etc.

Expansion Joints

240. The Philip Carey Company, Cincinnati, Ohio, presents a catalog of Carey Elastic expansion joint with physical and chemical description, numerous illustrated examples of use for streets, sidewalks and elsewhere. 70 pages, 8½x10½.

245. The Servicised Products Corp., 6051 W. 65th St., Chicago, Ill., issue literature describing their "Servicised Cellular Expansion Joint." Sent on request.

Rail Filler

250. The Philip Carey Company, Cincinnati, issues literature describing Elastite Rail Filler, a preformed asphaltic cushion fitting all rails, which absorbs rail movement, excludes water and frost and materially reduces track noise.

251. The Servicised Products Corp., 6051 W. 65th St., Chicago, Ill., issue literature describing Servicised Rail Filler. Sent on request.

Tarvia

260. "Tarvia-K. P. for Cold Patching." An instructive booklet illustrating and describing each step in patching a road with "Tarvia K-P." 16 pages, illustrated, 3½x9. The Barrett Company, New York.

261. "Road Maintenance with Tarvia." Shows how almost every type of road and pavement can be repaired and maintained with Tarvia. 56 pages, illustrated, 6x9. The Barrett Company, New York.

262. "Tarvia." An attractively illustrated booklet describing grades of Tarvia and showing photographs of actual applications. 32 pages, 9x6. The Barrett Company, 40 Rector Street, New York City.

263. "Tarvia Double Seal Pavements." Shows, step by step, the construction of a Tarvia pavement. Profusely illustrated with photographs. 24 pages, 6x9. The Barrett Company, 40 Rector Street, New York.

Preservatives

270. Preservation of Streets and Roads by the Use of Road Oil, with many illustrations and testimonials from users. The Standard Oil Co., of Indiana, Chicago.

271. Stanolind Paving Asphalt, a compound prepared by the Standard Oil Co. of Ind., is described in minute detail in booklet "Stanolind." Standard Oil Co. of Indiana, Chicago.

ROAD AND STREET MAINTENANCE EQUIPMENT

Dust Control

273. "How to Maintain Roads," by the Dow Chemical Company, Midland, Michigan, is a manual dealing thoroughly with dust control, road building and maintenance. It contains tables of composition, grading, etc.

Heaters, Asphalt and Tar

274. An illustrated catalogue describing portable and stationary asphalt heaters, tar and gravel heaters, pipe line supplies and contractors' equipment, issued by the Union Iron Works, Hoboken, N. J.

275. Aeroil Burner Co., Hudson Ave., Union City, N. J. Bulletin 44 describes oil burning "Smokeless" asphalt and tar kettles, surface heaters, paving tool heaters, maintenance patrol heaters for street, road and highway work.

276. The Mohawk Asphalt Heater Company, Schenectady, N. Y., presents a New Bulletin describing the Original Improved "Hotstuf" Asphalt Heater, an economical oil burning heater, for general construction and maintenance. 4 pages, 6½x10.

277. Connery & Company, Inc., of Philadelphia, has issued a new catalog describing improving types of Tar and Asphalt Heating Kettles for the road contractor. 30 pages, 6½x8½.

278. Connery & Company, Inc., of Philadelphia, has issued Bulletin No. P-1 describing Oil Burning Patrol Patching Heater for Paving Contractors, Street and Highway Departments.

279. A new catalogue of tar and asphalt heaters, sand and gravel dryers, paving tools, etc., for road and street work, has just been issued by Littleford Bros., of Cincinnati, Ohio. 32 pages, 6x9.

280. Littleford Bros., of Cincinnati, Ohio, issue a new illustrated book showing the application of the Andresen Road Repair Outfit in maintenance of Roads and Streets. 32 pages, 8¼x11.

281. The Chausse Oil Burner Co. present a new descriptive circular of the 2 quart hand torch and the 3 gallon hand torch. Other portable heaters and torches are included.

282. Chas. Hvass & Co., 508 E. 19th St., New York, issue a 28 p. catalog describing road making machinery, asphalt plants—portable and stationary, asphalt and tar kettles, bituminous distributor, portable air compressors, trailers, etc.

Road and Street Maintenance Equipment

290. "How to Maintain Roads," by the Dow Chemical Company, Midland, Michigan, is a manual dealing thoroughly with road building, maintenance and dust control. It contains tables of composition, grading, etc.

Snow Removers

295. "Snow Insurance," a booklet by the Barber Greene Company, Aurora, Illinois, tells and shows by illustrations how many cities clear their streets with Barber Greene Snow Loaders.

296. The Hadfield-Penfield Steel Co., Bucyrus, Ohio, has just issued new circulars describing Fordson Snow Removers and Hadfield-Penfield One-Man Graders.

297. Baker Snow Plows for Motor Trucks and Tractors, "V" and Straight Blade in various models and sizes. Catalog 216, 48 pges. Baker Mfg. Co., 525 Stanford Avenue, Springfield, Ill.

298. Caterpillar tractor snow removers at work are illustrated in a booklet issued by the Holt Manufacturing Company, Inc., Peoria, Ill., and Stockton, Calif. Specifications and testimonials. 10 pages, 8½x11.

Graders

300. "Modern Road Building with Adams Adjustable Leaning Wheel Graders," a 56-page book issued by J. D. Adams & Company, Indianapolis, Indiana, not only catalogues this company's line of machinery but contains many practical suggestions on road and street maintenance which are of interest and value to all officials. The catalogue illustrates and describes graders in 6½, 7, 8, 10, and 12-foot blade lengths, one-man power graders, one-man power maintainers, road drags, plows, drag scrapers, fresnos, wheeled scrapers, etc.

SEWAGE DISPOSAL APPARATUS

305. The Dorr Company, 247 Park Ave., New York City, in Bulletin 20, describes the use of its appliances for treating municipal sewage and industrial wastes and water. 8 pages, 8x11.

306. Link-Belt Company, Philadelphia, issues a book describing the Tark Sewage Screen for separation of solids from incoming sewage—a construction furnishing maximum fine screening capacity, in a minimum space, at minimum cost.

308. The Simplex Ejector Co., 2528 W. Madison Street, Chicago, Ill., in their bulletin "Simplex System" describe the Purification of Sewage with Activated Sludge by Mechanical Surface Aeration. Sent on request.

307. The Pacific Flush Tank Company, of Chicago and New York, publish eight separate catalogs on Sewer and Sewage Disposal Automatic Equipment, including pumps, Imhoff Tanks and Sewer Joint Compounds.

301. The Sanitation Corporation, 165 Broadway, New York. Sanitation screens and gates described in a series of illustrated bulletins, 126-2, 126-3, L-19, B-9.

309. The Direct Oxidation Process Corporation of Philadelphia, in a treatise describes the principles of its electrochemical process for treating waters, sewage and industrial wastes.

310. Advantages of Liquid Chlorine for disinfection given in booklet issued by the Electro Bleaching Gas Co., 9 East 41st St., New York.

311. General Filtration Company, Rochester, N. Y., issues two booklets: (a) General data on the Activated Sludge Process. (b) Booklets descriptive of Filtros, the diffusing medium in practically every activated sludge plant.

312. Full information on the Venturi Meter which has been used for sewage measurements for many years. Bulletin No. 210. Builders Iron Foundry, Providence, R. I.

313. San-Equipment Septic Tanks for homes, institutions, etc., not connected with sewers, are described and illustrated in a folder issued by Chemical Toilet Corporation, 801 Tree St., Syracuse, N. Y.

Sewage Pumps

320. Wood and Trash Sewage Pumps to suit varying needs are described in illustrated catalog 28-A, issued by the Pacific Flush Tank Co., Singer Building, New York.

Concrete Pipe

325. Reinforced Concrete Pipe for sewers, culverts and water conduits and advantages in using it are described in booklet by the Independent Concrete Pipe Co., 205 N. West St., Indianapolis, Ind.

Vitrified Clay Pipe

330. Traps, Elbows, T branches, slants and sockets and all standard clay pipe fittings. Catalog F, The Evans Pipe Company, Uhrichsville, Ohio, gives illustrations and prices.

331. Roming Clay elbows, channel pipe, T sections, reducers, etc. Illustrated in folder by the Romig Clay Product Company, Uhrichsville, Ohio.

332. Portland Vitrified Clay piping made especially for Chlorine lutes and acid systems, also sectional conduits, vitrified cable ducts and sewer pipe. Booklet by Portland Stoneware Company, 49 Federal Street, Boston.

333. Clay sewer pipe, elbows, branches, slants, curves and channel pipe, etc., at discount rates. Price and specification folder sent. Buckeye Fire Clay Company, Uhrichsville, Ohio.

334. East Ohio Sewer Pipe Co., Irondale, Ohio, issues a folder giving prices, sizes, etc., of Vitrified Sewer Pipe, wall coping, fire brick and other products of clay.

335. The Cambria Clay Products Co., Blackford, Ohio, Mfrs. of Vitrified Sewer pipe, Fire Brick, Hollow Building Tile, Wall Coping and other clay products, issues a folder giving prices, etc.

336. Patton Clay Mfg. Co., Patton, Pa., have a pamphlet containing such useful information regarding sewer pipe as, carrying capacity, directions for laying sewer pipe, weights of materials, etc.

337. The Crouse Clay Product Company, Akron, Ohio. Manufacturers of Akron Shale Sewer Pipe. Description given in a folder.

338. A new pamphlet containing interesting testimony on the value of vitrified glazed sewer pipe as a resistant of all acids and elemental conditions is offered by the Clay Products Association, Chicago, Ill.

Pumps

350. Pumps, well strainers, tube well supplies, pumping engines, pipe and water works accessories. A. D. Cook Company, Lawrenceburg, Ind. Catalog. 65 pages, 7x10.

351. The Kinney Mfg. Company, Boston, sends a folder of bulletins on Rotating Plunger Pumps, Unloading Pumps, also tables of information for water works calculations.

Pumps, Sewage

352. Aurora Pump & Mfg. Co., of Aurora, Ill., describe, in their Bulletins Nos. 101 and 200, their line of open end enclosed impeller, vertical and horizontal, high efficiency centrifugal sewage pumps.

(*Continued on page 54*)

USE THE COUPON AT BOTTOM OF THE FIRST PAGE IN THIS SECTION

Get Set for Snow Removal

H-P at work on the backbone of our highway system

Just as effective for work . . . down to the gutters

H-P's can be used to keep sidewalks clear

Our all-year-'round dependence upon highways is vital. All winter long *they must be kept open!*—our motor transportation system cannot be allowed to get clogged.

This is a gigantic undertaking and only snow-removal equipment of known merit should be used.

That's why highway authorities everywhere look so favorably on H-P equipment. H-P's are known to be above guesswork—able to do a specified job in a specified time at a specified saving cost with a specified "One Man."

Consequently H-P equipment earns all the year round. If excellent roads 365 days a year sounds attractive, let us send details.

Hadfield-Penfield Steel Co.
Bucyrus, Ohio

H-P's can be used to open only one side of a road . . .

. . . or for opening the road to its entire width . . .

. . . with work equally effective on backroads as highways

Pipe Seal

353. The Ruberoid Co., 95 Madison Ave., New York City, will send for your information a bulletin outlining the characteristics of Ruberoid pipe-seal and its definite advantages for making watertight joints in tile sewers.

STREET CASTINGS

360. Cast iron sewer blocks, ventilators, manhole covers and inlets, valves, etc., described in pamphlet by the South Bend Foundry Co., South Bend, Ind.

361. The Burch Sewer Inlets, manufactured by the Burch Plow Works Co., Crestline, Ohio, are illustrated in detail with complete specifications accompanying. Booklet. 30 pages, 5x9.

TRENCHING MACHINES

370. Harnischfeger Corp., successor to Pawling & Harnischfeger, Milwaukee, describes fully the construction and operation of wheel and ladder type gasoline powered trenchers for cutting trenches of various widths up to 18 ft. in depth. 34 pages, 8½x11.

STREET CLEANING AND REFUSE DISPOSAL

Flushers

375. A special folder describing GMC Flusher units is issued by the General Motors Company, Pontiac, Mich. Specifications of each model with illustrations.

Vacuum Sweepers

380. The Butler Vacuum Street Sweeper as used by New York and other large cities is described in an illustrated folder issued by the Butler Manufacturing Company, 1810-16 East 24th Street, Cleveland, Ohio.

Sweepers

385. Catalogue No. 4 issued by the Kinney Mfg. Co., Boston, Mass., gives complete information on the sturdy construction and simplicity of operation of the Kinney-Springfield Motor Sweeper, supplemented by numerous illustrations.

386. Street Cleaning implements—motor flushers, motor and horse drawn sweepers, sprinklers, can carriers, cans, hand brooms, trailers, dump bodies, carts, paper wagons, described and illustrated in 28 page catalog. Chas. Hvass & Co., 508 E. 19th St., New York, N. Y.

Garbage Disposal Plants

INCINERATION FOR MUNICIPALITIES

390. The Decarie Iincinerator Company of New York City has published a description of its 300-ton incinerator at 56th St. and 12th Ave., New York City. Profusely illustrated. 8 pages, 8x10.

WATER WORKS EQUIPMENT

Cement Lined Pipe

395. Steel or Wrought Iron Pipe lined with cement and special lead-lined joints, manufactured by the Cement Lined Pipe Co., of Lynn, Mass.

Derricks

400. A pipe line equipment catalogue on Water Works tools and equipment, derricks of different styles, lead melting furnaces (oil and coke burning), issued by Joseph G. Pollard Co., Inc., 146 Raymond Street, Brooklyn, New York.

Couplings and Tees

405. The Mueller Co., Decatur, Ill., Copper pipe for water works services and patented connections for jointing to corporation stops, iron pipe, etc. 22 pages, 4½x6.

Locating Leaks

410. How to detect and locate leaks by sound is told in two bulletins by the Empire Electric & Water Company, 452 Lexington Avenue, New York, distributors of the Geophone leak detector.

Hydrants

415. "R. D. Wood & Co., Philadelphia. Handy circular describing and illustrating "Mathews" Fire Hydrants, Gate Valves and other water works appurtenances. 16 pages, 7¾x10¾.

416. Gate Valves, Fire Hydrants, Indicator Ports, Floor Stands, etc., together with tables of calculation for mechanical engineers. Catalog 11, leather-bound, 100 pages, 6x9. Darling Valve & Mfg. Company, Williamsport, Penna.

417. Hydrants, tapping apparatus, gate locks, valves and curb cocks described in a series of bulletins issued by the A. P. Smith Mfg. Company, East Orange, N. J.

418. Diagrams, specifications and testimonials of Waterous compression fire hydrants and Waterous fire engines are given in a booklet by the Waterous Fire Engine Works, St. Paul, Minn.

419. "Newtype" Hydrants and Water Gates are described in a bulletin issued by the Kennedy Valve Mfg. Co., Elmira, N. Y. Bulletins contains diagrams and complete specifications.

Meters

425. "Watch Dog" Current Meters for every need manufactured by the Gamon Meter Company, 282 South Street, Newark, N. J. Catalog of illustrations. 19 pages, 7x10.

426. The Buffalo Meter Company, Buffalo, issues a very complete catalog describing Niagara and American disc water meters. These meters are made with either solid type casing or frost bottom casing.

427. The Buffalo Meter Company, Buffalo, issues a special catalog describing Niagara Oil and Gasoline Meters, which explains the method of installing and operating these meters.

428. "Water Meter Simplicity" by the Badger Meter Manufacturing Co., Milwaukee, Wis., is a neat booklet of information about Badger Meters and their construction. 22 pages, 6½x9.

429. H. W. Clark Co., Mattoon, Ill., issue literature describing the Clark Meter Boxes, Service Boxes, Valve Boxes and Valve Housings. Sent on request.

430. "The Venturi Meter for Main Pipe Lines" contains interesting information and illustrations of many installations of the Venturi Meter manufactured by the Builders Iron Foundry, Providence, R. I.

Pipe, Cast Iron

440. Cast Iron Pipe conveyors for caustics, acids, explosives and corrosive chemicals of all kinds. Booklet, "Cast Iron Pipe." Cast Iron Pipe Publicity Bureau, Peoples Gas Bldg., Chicago, Illinois.

441. "Planning a Waterworks System," is a booklet of highly valuable information for supervisors of waterworks in small municipalities. Issued by Cast Iron Pipe Publicity Bureau, Peoples Gas Bldg., Chicago, Illinois.

442. A handsome catalogue of 74 pages and profusely illustrated on Water Works Specialties, Gauges of all types, Meters, Meter Boxes, Finders, Adapters, and Housing is issued by the H. W. Clark Co., Mattoon, Ill.

443. The McWane Cast Iron Pipe Co., Birmingham, Ala., issues Catalog P, describing Cast Iron Pipe, sizes 1¼ through 8 inches, equipped with factory-made Precalked lead joints in the bells.

444. R. D. Wood & Co., Philadelphia, issues a new booklet giving weights and dimensions of Cast Iron Pipe and Fittings. A handy reference book for Municipalities and Contractors. 48 pages. 7¾x10¾.

445. James B. Clow & Sons, 534 Franklin Street, Chicago. Complete catalog and data book, for water works superintendents and engineers, showing cast iron pipe, fittings, manholes, specialties. Sent on request.

446. Cloth-bound Pocket-size volume, "AMERICAN PIPE MANUAL," 140 pages, standard specifications and valuable pipe information. Published by the American Cast Iron Pipe Company, P. O. Box 151-2, Birmingham, Ala.

447. Standard specifications for Cast Iron Water Pipe, De Lavand, and Special Castings, adopted from American Waterworks Association and American Cast Iron Pipe Company, Box 151, Birmingham, Alt.

448. American Standards for flange fittings and standard specifications for Cast Iron Pipe adopted by American Waterworks Association and American Gas Association. Booklet by Glamorgan Pipe & Foundry Co., Lynchburg, Va.

449. B. Nicoll & Co. issue a new bulletin describing the plants and products of Pont-à-Mousson, manufacturers of cast iron pipe. Tables of weights and specifications are included. B. Nicoll & Co., 294 Madison Avenue, New York City.

Pipe Concrete

455. "The Story of Tulsa's Spavinaw Project," "Bringing 'C' Up to 140 *Plus*," and General Catalogs on Lock Joint Reinforced Concrete Pressure and Sewer Pipes. Lock Joint Pipe Co., 16 Rutledge Ave., Ampere, N. J.

Pumps

460. Pumps of all kinds and for all municipal and industrial purposes illustrated with specifications, also engineering tables of pressure and heads. Bulletins issued by Goulds Pump, Inc., Seneca Falls, N. Y.

465. A valuable booklet containing hydraulic tables, tables showing head, capacity, speed and horse-power relative to discharge and suction diameters for pumps with 33 illustrations. Write Aurora Pump and Manufacturing Co., Aurora, Illinois.

466. A full line of Pumps for every municipal purpose, manufactured by Economy Pumping Machinery Co., 99 North Curtis St., Chicago. Complete bulletins containing much pump data sent upon request.

467. The Edson Manufacturing Corporation, Boston, describes its improved designs in diaphragm pumps, both hand and power; odorless force pumps, and suction hose for the same and other pump accessories. 9 pages, 8½x11.

Lead Melting Furnaces

470. Aeroil "Smokeless" Lead Melting Furnaces, kerosene as fuel, detachable burner will also melt lead joints, described in Bulletin 28 by Aeroil Burner Company, Hudson Ave., Union City, N. J.

Pipe Jointing Materials

475. Leadite as an economical composition for pipe joints described in a bulletin by the Leadite Company, Land Title Building, Philadelphia, Pa.

Pumping Engines

480. "When Power Is Down," by the Sterling Engine Company, Buffalo, N. Y., gives illustrations from various cities of Sterling Pumping Engines in use, with recommendations of models for standby services.

Sluice Gates

485. Sluice Gates of all kinds, Roller Bearing Pedestals, Hoisting Standards, Intake Gates, Plug Drain Values and other Water Works Appliances described in catalog by Coldwell-Wilcox Company, Newburg, N. Y. 34 pages, 8x10½.

Tapping and Valve Machines

490. The A. P. Smith Company, of East Orange, N. J., furnish descriptive matter dealing with their many labor saving devices as the Smith tapping machine, valve inserting machine and pipe cutting machines.

Valves

495. A complete catalogue of more than 100 pages containing descriptions, illustrations, specifications and price list of valves, watergates and hydrants for every purpose, mailed on request. Kennedy Valve Mfg. Co., Elmira, N. Y.

Water Purification

500. Chlorine and Salts for purification of water and disinfection of sewage with description of Pennsylvania Salt Manufacturing Company's facilities for supplying these cheaply. Booklet, 15 pages, 3½x6. Widener Building. Philadelphia.

MISCELLANEOUS

Blue Printing Machinery and Accessories

505. Sixty-four pages giving complete illustrations and descriptions of the most modern types of blue printing machinery including the famous Pease Peerless which prints, washes, potashes and dries by one continuous operation. The C. F. Pease Co., Chicago, Ill.

506. The Lufkin Rule Company, Saginaw, Mich.; New York; Windsor, Canada. Manufacturers of Measuring Tapes, Boxwood Rules, Spring Joint Rules, Straight and Folding Steel Rules, Fine Mechanics' Tools. General catalog No. 11.

507. Protection for bridegs, smoke stacks and all metal work by painting with silica-graphite is explained in three illustrated booklets, 3½x6½, by the Joseph Dixon Crucible Co., Jersey City, N. J.

"SIMPLEX" SYSTEM
of
SEWAGE PURIFICATION
with
ACTIVATED SLUDGE
by Mechanical Surface Aeration

"Simplex" Surface Aeration Plant at Colorado, Tex. Capacity 250,000 gallons per day. (3 Aerators)

ACTIVATED SLUDGE as a medium for the purification of domestic sewage and trade waste has become generally accepted by the Sanitary Engineering Profession as the most economical method of attaining a high degree of nitrification.

The "Simplex" mechanical surface Aerator will produce Activated Sludge at a minimum of first cost, and the simplicity of the apparatus guarantees a low operating charge.

The British Ministry of Health has approved this system, with the result that upwards of 20 Cities have already either Plants in operation, or under construction, including the following:

City of Manchester
City of Bury
City of Burnley
City of Colthrop Mills
City of Turton
City of Birmingham
City of Brighouse
City of Macclesfield
etc.

City of Prestolee
City of Whitefield
City of Bolton
City of Nelson
City of Epsom
City of Exeter
City of Thatcham
etc.

IN THE SPRING OF 1923 we began experimenting in this country with the "Simplex" Aerator, and since that time we have been conducting experiments with different kinds of sewage, notably, at the Maywood Plant of the Chicago Sanitary District with domestic waste, at the Argo Corn Products Co. with Starch waste, at Decatur, Ill. with a maximum of Starch waste and domestic sewage, and at Houston, Tex., with Packinghouse waste.

The result of these experiments has been eminently satisfactory, and we have recently installed the following Plants:

City of Colorado, Tex.
Glen Lake Sanatorium, Oak Terrace, Minn. for State Board of Health.
City of Milwaukee, one unit.

Contracts are under way of the following:
City of Rochester, Minn., 2½ million galls. per day.
City of Amarillo, Tex.
City of Garden Villas, Tex.
Houston Packing Co., Tex.

The total input of power taken is 19 horse power per million gallons of sewage treated, with domestic waste.

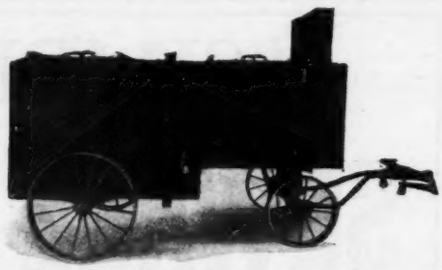
SOLE MANUFACTURERS and DISTRIBUTORS
in U. S. A. and CANADA

SIMPLEX EJECTOR COMPANY
2528-30 W. MADISON STREET
CHICAGO, ILL.

HVASS BITUMINOUS DISTRIBUTOR

"HVASS" EQUIPMENT

For State and Municipal Public Works



HVASS HEATING KETTLES—ALL TYPES and SIZES

CHAS. HVASS & COMPANY, INC.

Manufacturers of

Motor Truck Street Flushers
Motor Truck Street Sprinklers
Bituminous Distributors
Garbage and Refuse Trailers
Heavy Duty Trailers

Horse Drawn Sprinklers
Horse Drawn Sweepers
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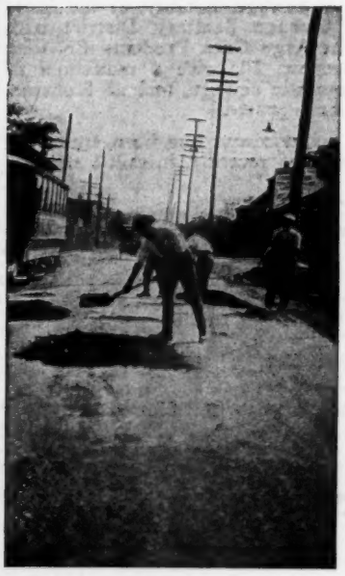
OFFICE: 508 EAST 19th STREET NEW YORK, N. Y.

HVASS SWEEPER—HORSE OR TRACTOR DRAWN

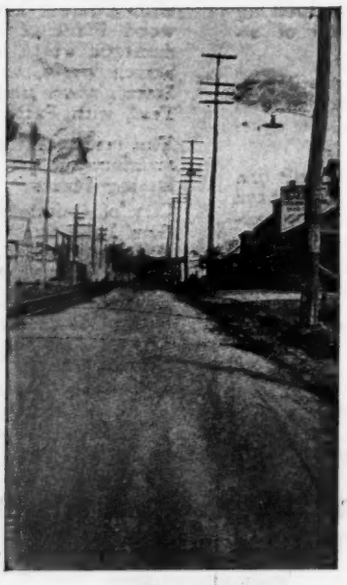
Write For Descriptive Catalogue

HVASS SPRINKLERS—HORSE OR TRACTOR DRAWN

COLD PATCH



(1) Repairing Bituminous Concrete



(2) Same, two months later, showing repairs after being consolidated by travel

HEADLEY No. 1

AN ASPHALTUM EMULSION

For repairs and resurfacing.

No expensive heating plant required.

Can be used in wet or dry weather.

No time lost account wet materials.

Write for descriptive booklets.

ASPHALT AND ROAD OIL

HEADLEY GOOD ROADS CO.

FRANKLIN TRUST BUILDING
PHILADELPHIA, PA.

What Can You Do With High Duty Gasolene Engines?

Sterling — THE ENGINE OF REFINEMENT

VISIT THE STERLING EXHIBIT AT THE POWER SHOW

GRAND CENTRAL PALACE, — NEW YORK

December 6-11, 1926 *Third Floor Space 446-447*

Quick starting, reliable emergency power for standby and peak loads. Drive generators, centrifugal pumps, tractors, bridges, air compressors, fans, sluicing pumps, irrigation pumps, fire protection systems, locomotives, passenger cars with Sterlings.

CAST IRON PIPE

NATIONAL

IS MADE RIGHT

CAST IRON WATER AND GAS

PIPE

By Sand Cast and deLavaud Centrifugal Processes. Fittings Flange Pipe, Flange Fittings and Special Castings

MANUFACTURED BY

National Cast Iron Pipe Company

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Jacksonville, Florida: 610 Bisbee Building
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Los Angeles: 903 Heilman Bank Building
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The BARTON Portable Pump Is Practical and efficient Here's the evidence—

American Steam Pump Company,
Battle Creek, Michigan.

Gentlemen:

Your Barton 2½" Portable Pumper, bought of you last September through your representative Mr. B. P. Barton, has given us very satisfactory service. We have a crew which uses this pump continuously in connection with manhole inspections and electrolysis testing. We have replaced two plunger type pumps with one Barton Portable Pump and find it saves time and money.

Yours very truly,
M. BOSE,
U. G. Maintenance Engineer.

Write for details on the Barton Portable Pump

AMERICAN STEAM PUMP CO.
BATTLE CREEK :-: MICHIGAN

Please THE MEN!

Here's a tip from the Chippewa Spring Water Company of Chicago: They have installed Highland Cabs on their trucks, and "the men on the trucks speak very highly of these cabs."

This company realizes the advantage of having contented drivers. It also realizes the advantage of having sturdy cabs that are free from constant repairing.

Why not avail yourself of these Highland advantages and install the cabs on your own trucks?

Let us show you how the Highland Cab can make your drivers more satisfied.

THE HIGHLAND BODY MFG. CO.
404 Elmwood Place, Cincinnati, Ohio

HIGHLAND *Cabs*

The GAUNTT Dry Chemical Feeder

designed for feeding any dry material, especially Hydrated Lime and Sulphate of Alumina for water purification.

These machines have been on the market ten years and have met with unqualified success. We are furnishing them to large and small cities all over the country.

Write for Catalog No. 25 giving full description

W. J. SAVAGE COMPANY, Inc.
Knoxville, Tenn.

HOTEL KNICKERBOCKER

120-128 West 45th Street
Just East of Broadway
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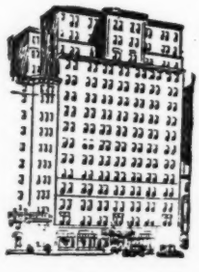
NEW YORK'S NEWEST HOTEL

A location unsurpassed. A few seconds to all leading shops and theatres. Away from the noise and bustle and still convenient to everything. Between Grand Central and Pennsylvania Terminals.

Rates $3 to $5 per Day

400 Rooms



400 Baths

DIXON'S Aluminum-Graphite Paint

Prepared primarily to meet the special requirements of industrial companies and wherever a light colored paint is desired.

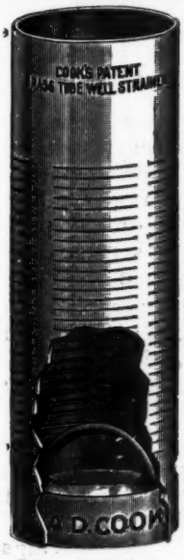
Composed of aluminum and flake silica-graphite as a pigment like fish scales, provide a covering of unusual elasticity and and boiled linseed oil as a vehicle. These flakes, lapping over durability.

A paint that is not affected by gases, fumes, and which resists sunlight, air and moisture.

Ask for Circular 102-AB.

Additional information and prices will be sent upon request.

JOSEPH DIXON CRUCIBLE CO.
JERSEY CITY, N. J. ESTABLISHED 1827



If You Have a DEEP WELL ending in WATER-BEARING SAND OR GRAVEL.

equip it with the COOK PATENT BRASS TUBE WELL STRAINER and secure the maximum capacity of the well free from sand or particles of any kind. These strainers are in use by the Department of Water Supply of New York City, Parkersburg, W. Va., Memphis, Tenn., and Dayton, Ohio.

Upon the completion of the well, **allow us to quote upon a Steam** Belt or Motor Driven Deep Well Pumping Outlet.

Write for New Catalogue

A. D. COOK, Incorporated Lawrenceburg, Ind., U. S.

"STEWART SEWER CLEANING MACHINE"
"Used in Nearly Every State in the Union"

SEWER RODS

We pay freight and ship for trial. Who else will do it?
W. H. STEWART

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DONALDSON IRON CO.

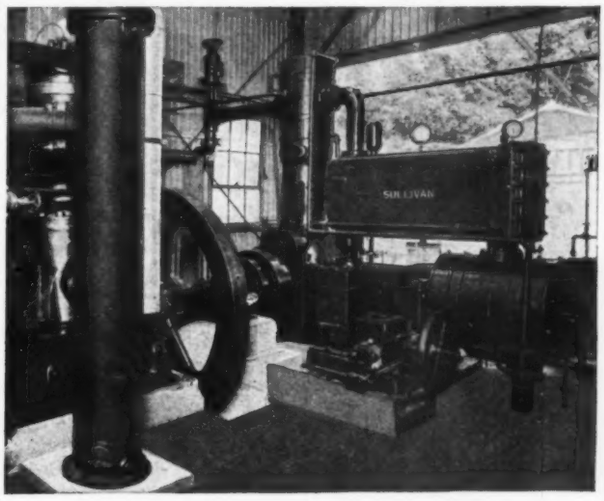
EMAUS, LEHIGH CO., PA.

MANUFACTURERS OF

CAST IRON PIPE

FOR WATER and GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK



Cutting Air Costs

On a $500,000,000 Subway

Contractors Arthur McMullen Co. deserve special credit for their work on New York's new west side subway. Their drills, sharpeners, hoists and air-operated power shovels are run by a compressed air plant of striking economy.

McMullen Co. has two Sullivan "WN-32" Angle Compound Compressors, each direct connected by a flexible coupling to a Fairbanks-Morse 240 H. P. Diesel type oil engine. The compressors have a capacity of 1300 cubic feet each, and they deliver air at 120 pounds pressure.

It is estimated that within three years' time the oil engines will pay for themselves in power saved, but power economy is not the only advantage of this plant. Remember, they are using

Sullivan Angle Compound Compressors

In "angle compound" design, the high and low pressure cylinders are in the same vertical plane, at right angles to each other. This conserves floor space and foundations, and permits easy direct connection to an oil engine.

Another feature distinctive of angle compounds is their remarkable freedom from vibration, due to the exact balance of the vertical and horizontal members and working stresses.

Angle Compound Compressors are built in capacities from 500 to 3700 cubic feet—for oil engine, steam or electric-motor drive. Details: "Wafer" air valves, 3-pass copper intercooler, multi-step load control, automatic lubrication—all are described in Bulletin 3381-A.

Write today for Catalog 3381-A

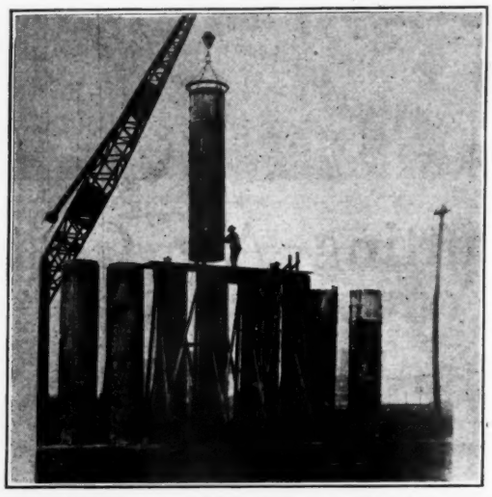
SULLIVAN TRADE MARK
MACHINERY COMPANY
138 South Michigan Ave., Chicago

Newark

REINFORCED CONCRETE PIPE

"It makes a better joint"

LONG PIPE IS EASY FOR US!



NEWARK CONCRETE PIPE CO.

462 BROAD STREET NEWARK, N. J.

GOULDS

A Type for Every Service

Bulletins on request

GOULDS PUMPS

INCORPORATED

SENECA FALLS, N. Y.

PUMPS

AMERICAN AND NEW NIAGARA WATER METERS

SOLID CASING TYPE

FROST BOTTOM TYPE

American and Niagara Meters are the most complete line of disc water meters made in one factory. Somewhere in this line of meters will be found a type of casing, register and dial that will suit the preference of any purchaser or the requirements of any service conditions where a disc meter is used.

Niagara and American Meters are made in ten different pipe sizes having either round reading register or straight reading register. In the 5/8", 3/4" and 1" sizes, the casing may be of the breakable frost bottom type as well as the solid casing type.

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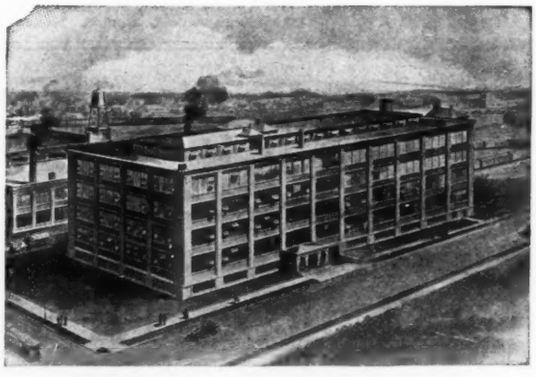

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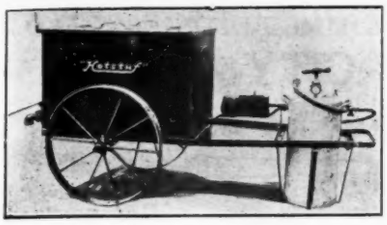

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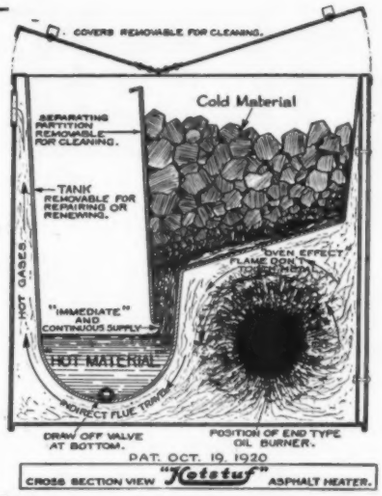
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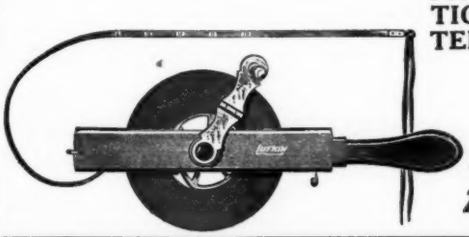

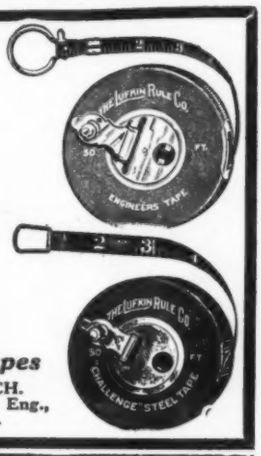

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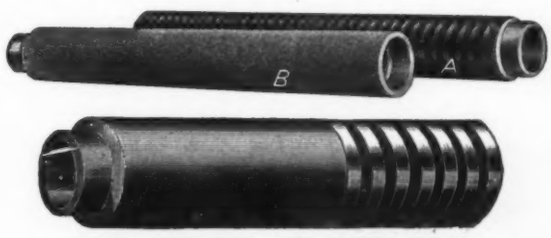

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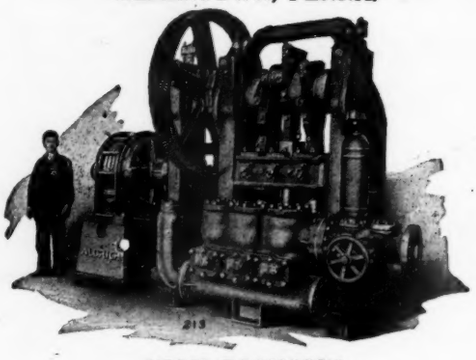

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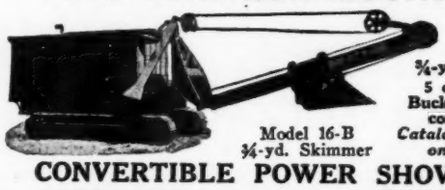

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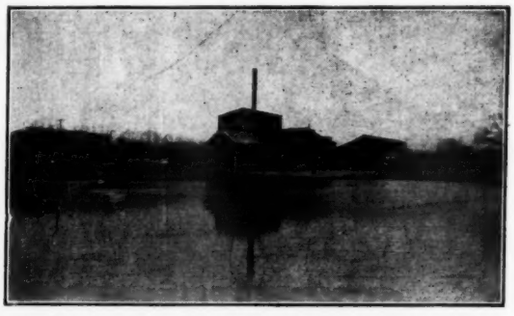

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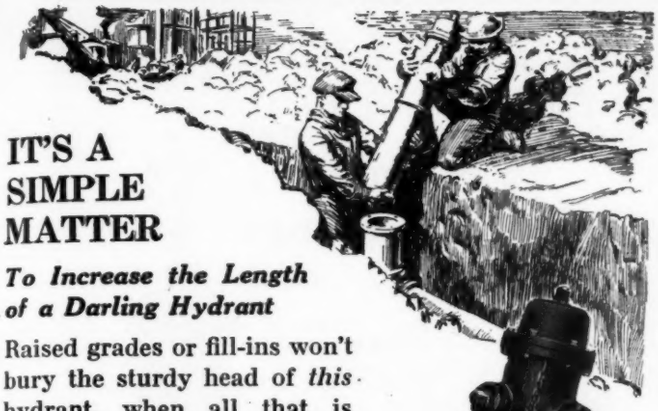

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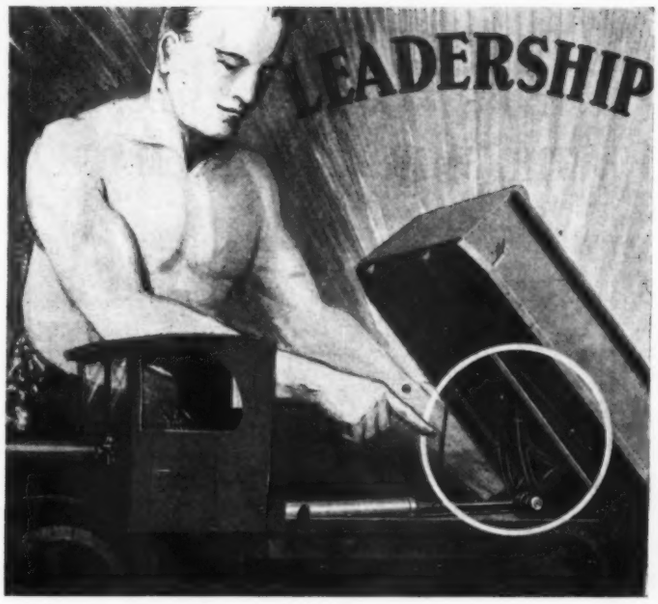

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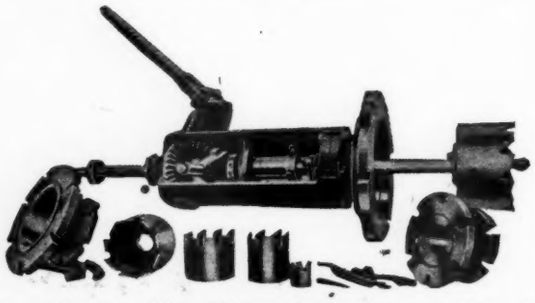

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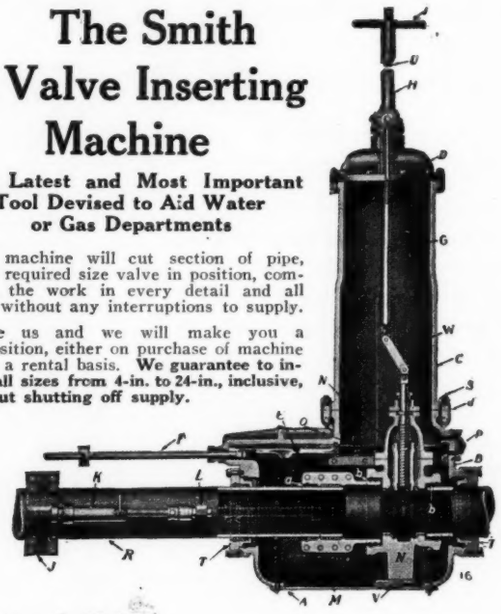

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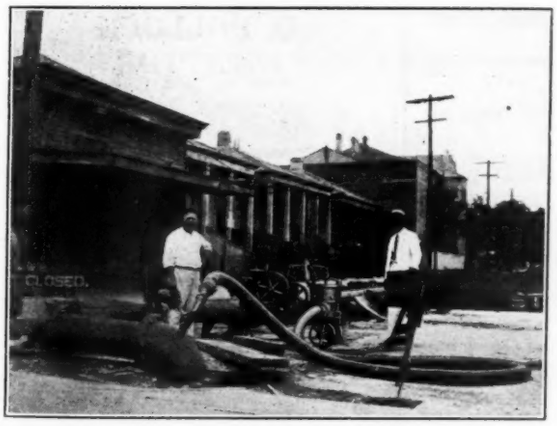

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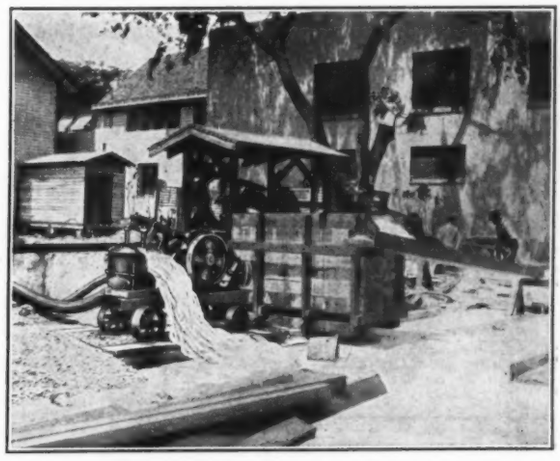

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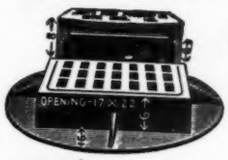

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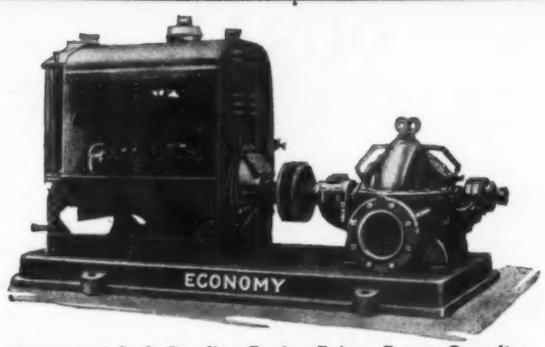

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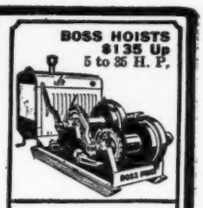

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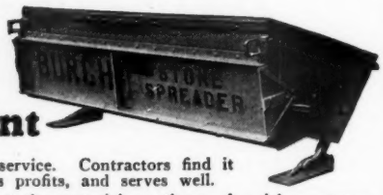

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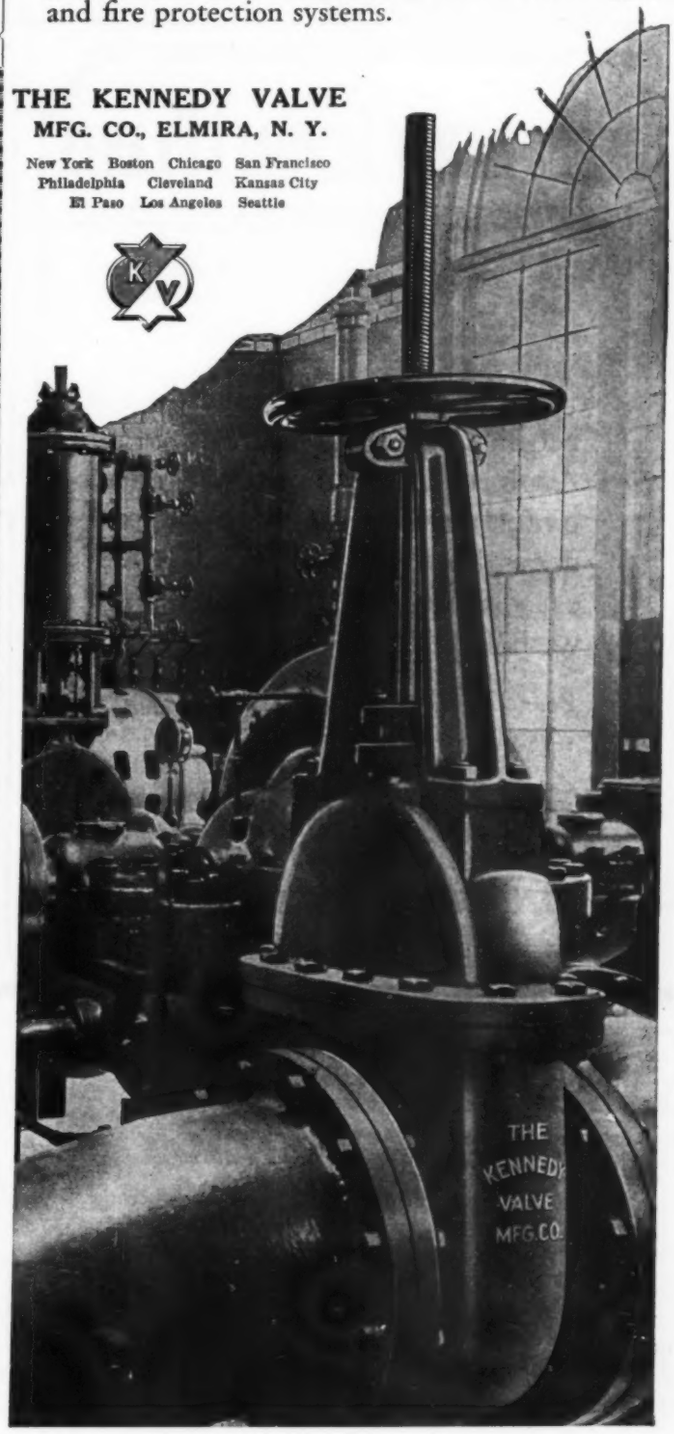

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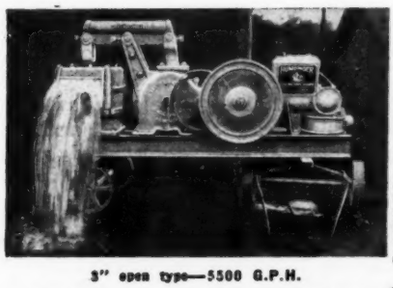

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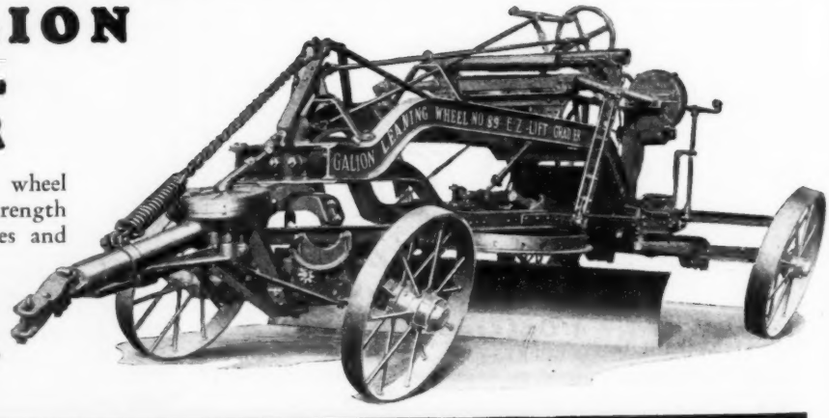

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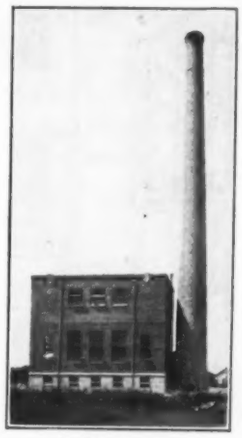

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No. 3—Russell Motor Patrol Has McCormick-Deering 10—20 Tractor For Power

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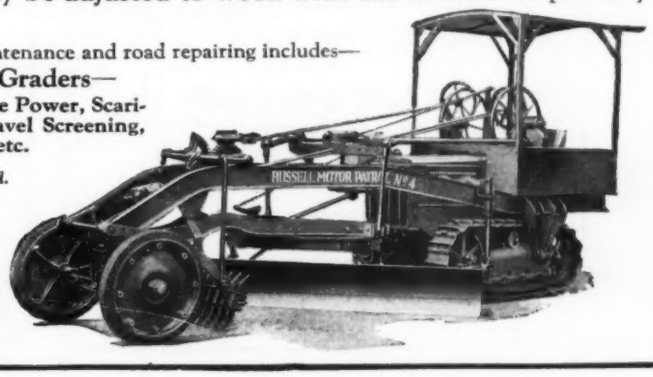

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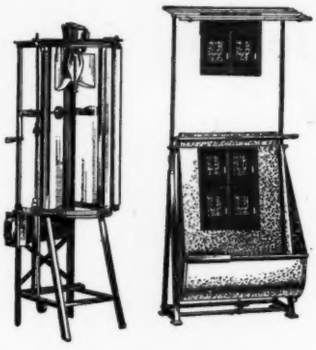

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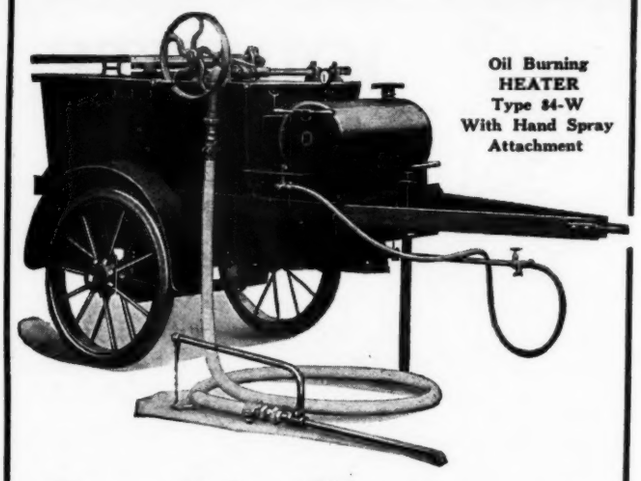

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Manufactured by

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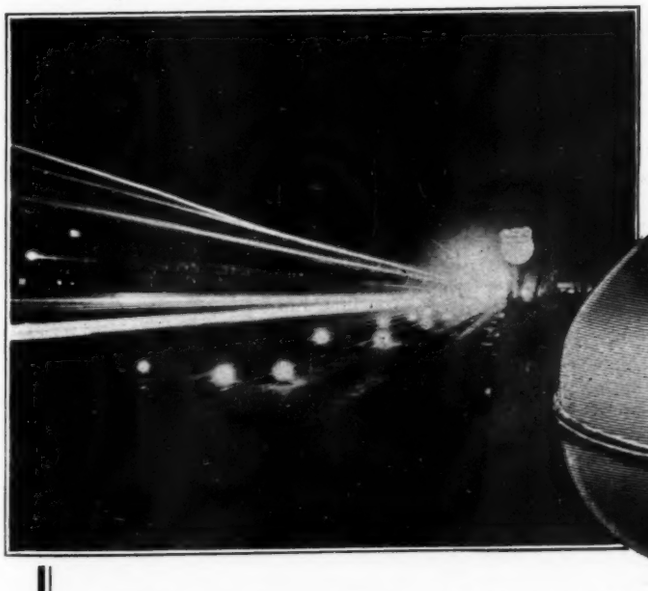

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It burns fuel oil, therefore is economical.

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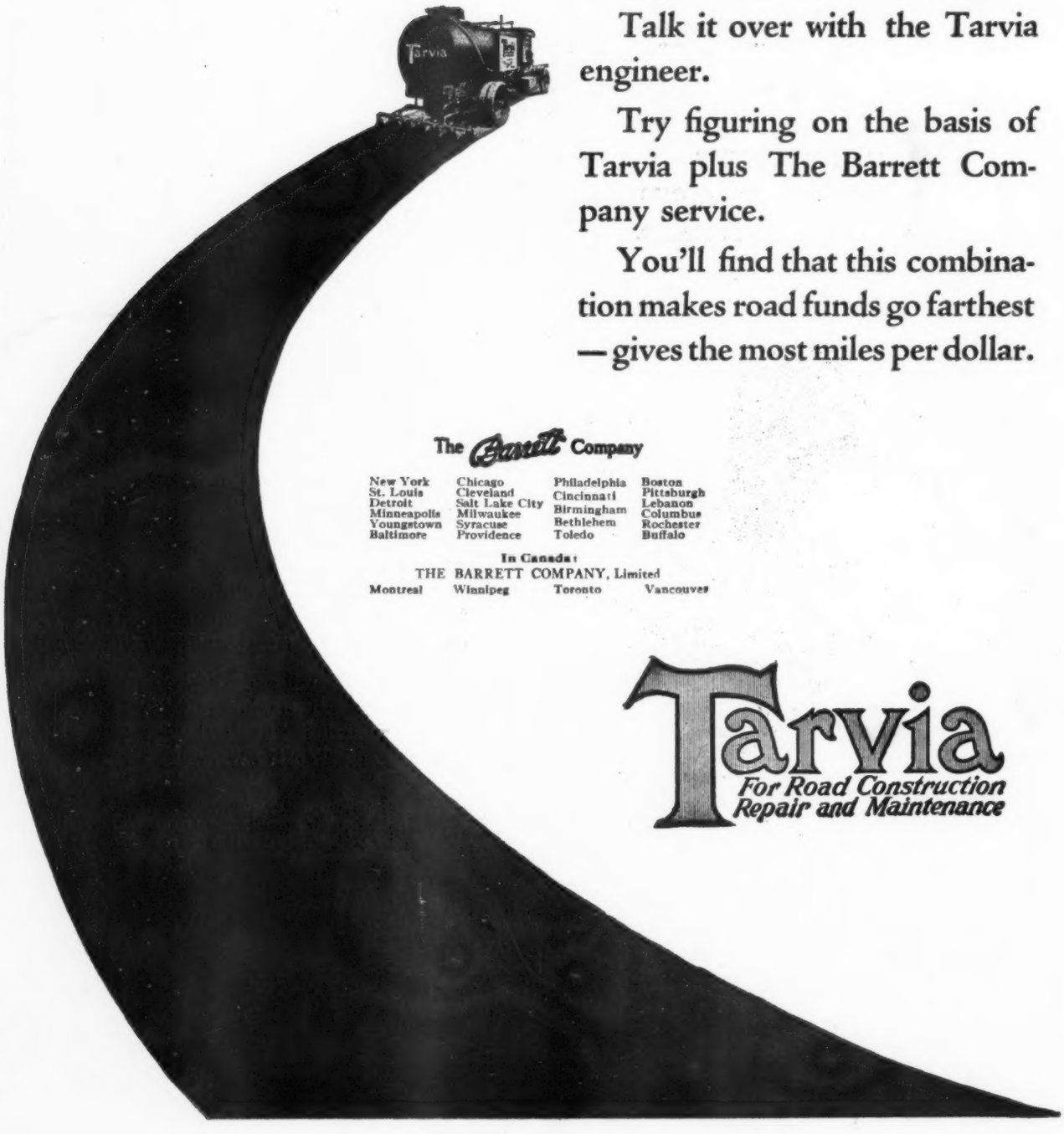

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